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ERRATA

Page 1, line 7, for bodily read boldly.

Page 202 and 204 should be interchanged.

Page 227 et seq., *Euploea amyntome*, *E. midamus*, *Ergolis ariadne*, *Clerome eumeus*, *Argynnis hyperbius*, *Atella phalantha*, *Junonia hirta*, *Pantoporia opalina*, *P. perius*, and *Vanessa canace* are also figured on Plate 19.

Page 395, for Diagnosis of Pharyngodon read Specific Diagnosis, for Diagnosis of Species read Description.

Page 407 et seq., *Papilio agamemnon*, is also figured on Plate 19; *P. clytia*, *P. demoleus* and *P. polytes* are figured on Plate 20.

Page 532, plate 19, fig. 16, for agamemnone read agamemnon.

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THE FRESH-WATER FISHES OF CHUSAN ISLAND

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and

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Chusan or Chushan Island is the largest of the group known as the Chusan Islands or Chusan Archipelago, lying off the mouth of Hangchow Bay. There are said to be more than 500 islands in the group, most of them small and some of them mere rocks. They are all mountainous, and may be regarded as the seaward extension of that mountain chain of Chekiang Province which passes eastward and northward from Ningpo and strides bodily out into the Yellow Sea.

Chusan is about 20 miles long measured from northwest to southeast along its greatest length, and is ten and a half miles across at its greatest width. Its highest peak is no more than 1670 feet in height, but the upper part of the mountains is rocky and usually very precipitous. From the central part of the island ranges of mountains or hills ramify outward in all directions, and descend into the sea as great rock ramparts which divide Chusan into a series of isolated valleys.

Originally each valley had its own creek or brook which made its way to the sea, and in the larger valleys on both the north and south sides of the island there were permanent streams from mountain slopes to the sea. In the case of the larger creeks the mouth of the stream was an estuary. In some cases the valley floor was not raised perceptibly from estuary to the foot of the hills, but usually by the time a distance of three miles from the sea had been reached the valley floor began to rise rapidly and the streams became swift stony noisy brooks. The valley floors and hillsides were alike in being well forested, so that water was retained and the streams kept well supplied throughout the year.

After the island became thickly settled this was all changed. The forests were cut down, the deer and other wild animals killed off, springs dried up, and only part of the streams remained permanent. Great sea walls were built across the mouth of each valley just above

high tide, thus excluding sea water from the lowland marshes about the estuaries. The estuaries and water courses in the salt marshes were converted into a labyrinth of anastomosing fresh-water canals which loop their way over all the lowland and a long way back toward the hills. In one branch of Tinghai Valley the canal goes almost to the foot of the hills to what was evidently at one time a swamp.

The lands about the canals were made into rice fields and gradually the valley floors were levelled or terraced till they too are rice fields clear back to where the streams begin, or rather to where water can be diverted upon them. In some instances parallel valleys have been so altered in their upper portions that now one can walk around front the upper part of one into the upper end of the other without going over any hill, the whole area having been converted into rice fields with only trivial differences in elevation.

The longest stream on the island is the Tsai-ao (蔡杏), on the south side. In the upper Tsai-ao the stream has, in places, been diverted into another channel high above the original one. We then have the rock-strewn bed of the stream two or three feet above the adjacent rice fields, and twenty-five or thirty feet above its former natural level. The same thing is seen in other valleys on the north as well as on the south side of the island, so that the present course of the streams is, very often, a man-made one, more or less modified by long decades during which erosion has made many changes, cutting banks, scooping out holes, depositing gravel here to there.

Chusan is covered with a net-work of roads from three to five feet wide, paved with small cobble stones, less often with hewn slabs. Where the Tsai-ao has been carried far above its natural channel it is kept within bounds by a solidly constructed barrier of masonry which is also the road, wide enough and strong enough to serve for automobile or truck.

As a result of man's interference and the conversion of the valleys into rice fields, the streams are entirely changed in character from their original condition. The lower portion is an almost stagnant body of water with no perceptible current, made foul by the refuse of a dense population near the sea. Heavy gates of masonry at one or two points in the seawall protecting a valley allow a trickle of water to escape, thus preventing complete stagnation. Occasionally at high tide the young of a very few kinds of fishes are able to make their way from the sea through crevices in the gates and pass into the canals and there maintain themselves.

The middle portion of the streams is usually dry for a large part of the year, water having been diverted higher up for irrigating the rice fields. Ordinarily some water is to be found in pools here and there along this section, and when water is shut off from the rice fields to dry them for harvest this part soon becomes partly or even entirely filled with water. In the upper part of most of the

streams no water is to be found during a large part of the year, as it is all taken for irrigation purposes. Only in the larger streams is there running water in the upper section throughout the year.

The effect of all these changes upon the composition of the original fish fauna of Chusan Island must have been considerable, so that the fishes of to-day are by no means the same as those of 250 years ago. Some species must have been exterminated when the upper portion of a stream bed was left bare and all the water was diverted into irrigation ditches or transferred to an entirely different channel lacking all the things which made life possible for a given species.

Our knowledge of the fauna and flora of Chusan Island is based upon the writings of Dr. Theodore Cantor and John McClelland. During the Opium War of 1840-42, Dr. Cantor was stationed for many months at Chusan and made extensive observations on its plants and animals, which he afterward published. McClelland's paper was based on a small collection of fishes made by Dr. Playfair, surgeon of one of the British vessels, at both Chusan and Ningpo.

McClelland divided the fishes obtained into marine, estuarine, and stream fishes. As might be expected, the estuarine fishes have disappeared to all appearances, as we have been unable to find any of them. As for the fishes of the strictly fresh-water streams of the upper portions of the valleys, only those which can stand the confined life of small pools are able to survive. We do not know just what kinds of fishes were there before man altered the streams, but at present they are few in number.

Cantor listed *Leuciscus daniconius*, now *Rasbora daniconius* Buch., Ham. *Anabas scandens* (Daldorff), *Synbranchus grammicus* Cantor, and *Eleotris flammans* Cantor. McClelland had *Amphiphrous cuchia* Muller on his list from Chusan. In one place he lists *Barbus putitora* Buch. Hain. from Chusan and later on says Dr. Playfair found it at Ningpo.

Cantor first collected at Lantau, an island near to and larger than Hong Kong, but his preservative proved to be worthless, so that his collections began to spoil after arriving at Chusan, and he relied on sketching his finds instead of trying to keep specimens. We may safely reject his records of *Rasbora daniconius* and *Anabas testudineus* Bloch, as he had neither specimens nor sketches of them. What he took for *Rasbora daniconius* was without doubt *Pseudoraspbora parva* (Schlegel), the commonest fish in Chusan streams. *Anabas* does not occur at Chusan and, unquestionably, never did occur there. Cantor was either mistaken in his identification or else the specimens came from some place far nearer his starting point, Calcutta, than Chusan. *Anabas* is a fish eminently adapted to life in the rice fields and ditches, and is able to hold its own under the most adverse conditions save one, climate. If *Anabas* were native to Chusan the activities of man, far from exterminating it, would have

merely provided a larger field for it to occupy. *Eleotris flammuns* Cantor seems to be a valid species but apparently has vanished from the "canals and estuaries" where Cantor found it.

Amphipnous cuchia Muller, described by McClelland under the name of *Pneumatobranchus cinereua*, does not occur at Chusan and was evidently a case of a specimen with the wrong locality label. Only those who have collected in many different localities while traveling through several countries can appreciate the difficulty of correct labelling, and the ease with which specimens from one country may get locality labels of another country. *Barbus putitora* Buch. Ham. does not occur at Chusan; as *Barbus tor* it may yet be found at Ningpo. *Macrognathus undulatus* McClelland, listed by him as an estuary species, has not been found by us and we are doubtful about its survival here.

Fishes are taken commercially from the canals by means of large cast nets; the species caught in this way will be indicated later. Large quantities of small *Carassius auratus* are taken by angling, a sport indulged in by young and old, men, women, and children. *Pseudorashora parva* is taken in large numbers from canals by various sorts of nets, for home use. In the running streams and pools, and in water holes in the upper valleys people angle for *Carassius*, use scoop nets in shallow pools, and divert streams or pump water out to get the fish contained in deeper parts of the streams. No fish traps or eel pots are used, and the people do not seem to know of any method other than hook and line for getting fish in the larger running streams.

In the lowlands a few individuals have small fish ponds where they cultivate *Cyprinus carpio*, *Mylopharyngodon piceus*, *Ctenopharyngodon idellus*, *Aristichthys nobilis*, and *Hypophthalmichthys molitrix*. The fry for stocking these ponds is obtained from near Shanghai.

FISHES OBTAINED DURING SEPTEMBER AND OCTOBER 1936

1. *Elops machnata* Forskål

Specimens up to 250 mm. in length are taken by cast net from the canals. Not abundant.

2. *Fluta alba* (Zuieuw)

Found in canals and in permanent pools of the larger streams, as well as in rice fields occasionally. Reaches a length of nearly half a meter, when it becomes bulky. Not very abundant.

3. *Anguilla sinensis* McClelland

Very common in the middle and upper portions of the streams and caught in cast nets in the canals. It is always to be found in pools bordered by retaining walls, as it finds excellent hiding places in the rock crevices. Reaches a length of nearly a meter. Several

dozen may be taken from a single pool, of all sizes from slender young eels of 150 mm. or so up to large bulky adults.

4. *Zacco platypus* (Schlegel)

Abundant in the headwaters of streams where there is clear water and a good current. Reaches a length of about 110 mm. Large males are among the most brilliant and beautiful of cyprinid fishes, their sides decorated with cross bands like the rosy streamers of sunrise.

5. *Gobio (Leucogobio) polytaenia* Nichols

This elegant and handsome fish is abundant in the headwaters of the Tsai-ao, but has not been obtained elsewhere.

In life the color is dusky above and white or nearly white on the lower half, with a conspicuous black band from the shoulder to the caudal base; there are no other marks on the body. The dorsal has a series of elongate black spots or blotches on the rays, the intervening membranes clear, the spots forming a broad black band along the middle of the fin; the other fins are all more or less golden.

In formalin the color becomes greatly altered; the body becomes flecked with black spots, each scale down to the level of the upper angle of the pectoral with a small black spot, the spots forming a series of more or less evident longitudinal black lines; some specimens have the sides spotted and lined clear down to the angle of the ventral fins. The top of the head is dark olive brown.

Our largest specimens are about 90 mm. long. An examination of several hundred specimens, both living and freshly preserved, indicates a considerable amount of variation. Comparison with *Gobio (Leucogobio) taeniatus* Gunther, from the Tsien Tang Kiang, causes us to believe that *G. polytaenia* is, in all probability, a synonym of *G. taeniatus*. The Tsien Tang River material agrees exactly with the keys of authors, but cannot be distinguished by color from the Chusan Island material. Study of a large series of *G. taeniatus*, *G. polytrenia*, and *G. taeniellus* would probably show them to be all one and the same species which would take the oldest name, *G. taeniatus*.

6. *Pseudorasbora parva* (Schlegel)

This little silvery cyprinid is very abundant everywhere, far outnumbering any other species of its size or larger. The only other fish which might equal it in numbers is the tiny *Aplocheilus* of the rice fields. From the foul waters of the canals in the waterfront section of Tinghai to the headwaters of all streams this fish occurs and seems to thrive equally well throughout. It attains a length of 75 mm., but most specimens are much smaller.

In spite of its small size, it is eagerly sought and large numbers are taken by various kinds of hand-manipulated gill nets and

basket-like nets. Many are taken in the following curious way. A sort of dip net, stretched on a bamboo frame, with a long bamboo handle standing up over the center, is lowered into the canal alongside the bank by a man in the bow of a boat. The boat moves off some distance, perhaps a hundred feet or more, beside the bank. The man in the stern then begins to pound on a board, making a peculiar double knock, keeping this up while the boat is propelled back to the net. When the net is reached the man at the bow pulls the net up as rapidly as possible and takes from a few dozen to several hundred fishes, all *Pseudorasbora*. The men claim 'no other fish is ever taken by this method. This fish is never sold in the market.

7. *Culter alburnus* Basilewski

Common in the middle section of the permanent streams and in pools where the stream is dried up, and also in the upper portion of the canals where the water is rather clear. Reaches a length of about 200 mm.

8. *Cultriculus kneri* (Warpachowsky)

This species likewise occurs in the upper portion of the canals and in the middle reaches of the streams, along with *Culter alburnus*, but is not as common, and apparently does not reach quite as large a size.

9. *Rhodeus ocellatus* (Kner)

This species does not seem to occur in abundance anywhere, but is found in the upper part of the streams and down to the head of the canals. Our few specimens are all small, 25 to 40 mm. in length.

10. *Acanthorhodeus atranalis* Günther

This lovely little fish is widely distributed but is not very abundant in the streams of Chusan. It is said to live in the rice fields in the lower valleys, but we did not take any there. A few specimens were taken from the upper ends of canals to the headwaters of streams on both sides of the island. In life the glittering iridescent colors of this fish make it a very desirable aquarium species. It reaches a length of 60 mm. or perhaps more.

11. *Cyprinus carpio* Linnaeus

The common carp is found in the canals, from whence it is taken by cast nets for the market.

12. *Carassius auratus* (Linnaeus)

The wild goldfish is very abundant in the canals, where large numbers are taken daily both by cast nets for the market and by angling for sport and domestic use. It also occurs in all the larger streams up to their headwaters.

13. *Misgurnus anguillicaudatus* (Cantor)

This species was found throughout the streams, in both running water and all sorts of pools, and in places is very abundant. At times it is also in the rice fields. It probably occurs in the canals also, at least in the upper part, but we have no specimens from there. The largest specimen taken was 175 mm. in length. The two species of *Cobitis* listed and described by McClelland are both variants of this species. *Cobitis pectoralis* and *Cobitis bifurcata* may be duplicated from any pool where *M. anguillicaudatus* is abundant. With advancing age there is great variation in the relative depth, thickness, and other proportions, and very noticeable color variation.

14. *Parasilurus asotus* (L.)

A common inhabitant of the larger streams and pools, where it hides under rocks and in the crevices of retaining walls in company with the common *cel*. Reaches a length of 350 mm. or more.

15. *Liobagrus anguillicauda* Nichols

Found only in the upper waters of the Tsai-ao, where it dwells in gravelly reaches and rocky pools and is plentiful. More than 75 specimens were taken, the largest 94 mm. in length. Living specimens are pink or nearly so, becoming more or less yellow after being preserved. Our material agrees with Nichols' description and figure from Fukien specimens.

16. *Aplocheilus latipes* (Schlegel)

This tiny fish is excessively abundant in rice fields and ditches and along the margins of the canals in their upper portion; occurs to some extent in the headwaters of streams.

17. *Ophicephalus argus* Cantor

Found from the lowland canals to the middle and upper sections of the creeks, but not abundant anywhere. It is taken with the cast net for the market. Reaches a length of half a meter, but such specimens are rare. After attaining 350 mm., standard length, they increase thereafter mainly in bulk. The largest one taken weighed more than 5 catties, or about 6½ pounds.

18. *Macropodus chinensis* (Bloch)

Listed from Chusan under the name of *M. opercularis*, a very different fish, with which it was long confused. Generally distributed over the island, in streams, ditches, and rice fields, but nowhere very abundant. A good aquarium fish.

19. *Mugil xanthurus* Richardson

Found in the canals, where it is caught with cast nets for the market. Reaches a length of 400 mm., perhaps more.

20. *Liza menada* Tanaka

Likewise an inhabitant of the canals, and taken with cast nets for the market. Reaches a length of 350 mm. or more. Living

specimens have a yellow or golden tail, a yellow or orange anal fin, and the upper part of the iris is orange red, the remainder of the iris golden.

21. *Lateolabrax japonicus* (Cuvier & Valenciennes)

This handsome fish is found in the canals and is caught with cast nets for the market. It reaches a length of 350 mm.

22. *Sparus latus* Houttuyn

Occasionally taken from the canals by cast net and sold in the market. Those commonly seen are all small, not over 200 mm. in length.

23. *Trachidermus fasciatus* Heckel

Found in stony creeks, but not common; our largest specimen is 80 mm. long.

24. *Ctenogobius giurinus* (Rutter)

The handsomely colored goby is very abundant in the upper waters of Tinghai Valley and some are to be found in the higher elevations as well as the middle and stonier portions of all streams. Attains a length of 65 or 70 mm.

25. *Rhinogobius cliffordioppei* Nichols

This small goby was found only in the upper waters of the Tsai-ao. It lives in gravelly places where it hides beneath the stones, darting out with a rapid zigzag motion and then back beneath a bit of rock. Its barred sides with their dark cross bands blend with its surroundings so that it is very difficult to see. The largest specimen taken was 42 mm. long.

It probably occurs elsewhere but no specimens have been secured from other streams. A very small goby, seen in a gravelly pool in a creek on the north side of the island, was probably this species, but no specimens were caught.

舟 山 淡 水 魚 類 誌

美 國 士 丹 福 大 學 海 里

浙 江 省 水 產 試 驗 場 林 書 顏 合 著

(摘 要)

舟山為定海縣管轄各島中之最大者。島中多平原低地，墾為稻田，歷時已久。從山峯間流出之溪澗，連低地之溝沼經人工掘為河道，以利交通並為灌溉之用。河中魚產頗豐。自 1842 年英人 Cantor 及 1844 年 McClelland 二氏採集及研究本島淡水魚類之後，迄今九十餘年，尙無人再行研究者。此次著者經一月有餘之努力，在各山峯河溪，遍行採集，結果僅得二十五種。

SOME PRELIMINARY TESTS ON THE LONGITUDINAL CRUSHING STRENGTH OF HUA-MEI CHU, A VARIETY OF *BAMBUSA TULDOIDES*

By F. A. MCCLURE

*Curator of Economic Botany, Lingnan Natural History
Survey and Museum.*

The writer was asked recently to recommend a bamboo locally available in quantity and having characteristics likely to fit it for use as a reinforcing material for cement construction. Data on the longitudinal crushing strength of the bamboo were requested at the same time.

The variety known locally as *Hua-meı Chu* (花眉竹) was chosen for recommendation because the uses to which it is commonly put by the Chinese people require substantially the same mechanical characteristics as those desired in a reinforcing bamboo, namely, durability and high longitudinal crushing strength. This bamboo is locally used chiefly for scaffolding, for the framework of matsheds and for punting poles, for which purposes it has no peer.

This bamboo is always referred to in the markets and among building constructors at Canton as *Ch'ang-kao Chu* (樟槁竹), but inasmuch as this vernacular name is also sometimes applied, erroneously, to the closely related species, *Bambusa tuloides* Munro, it seems best to give preference to the name which has not been misused. The names *Ni Chu* (泥竹) and *Yu Chu* (油竹) are also used for bamboos of this species in some localities.

Botanically, this variety differs from *Bambusa tuloides* Munro in a number of technical characters and will be given taxonomic standing by publication in a separate paper. Among those who use bamboo in construction work, it is considered to be markedly superior to *B. tuloides* in both strength and durability. Furthermore, as seen in the Canton markets, the culms of this thick-walled bamboo are readily distinguishable from all others, with which they are likely to be confused, by the presence of light colored longitudinal striations on the internodes. The name *Hua-meı Chu* alludes to these characteristic stripes. These stripes are still recognizable, even after the bamboo has been subjected to soaking in water for some time.

The material secured for testing was selected at random from the stock of a wholesale dealer in Canton, and represents fairly well what would be obtained if the bamboo were to be purchased in quantity from the open market for actual use in the proposed construction.

The original source of the stock was given as Hwai-tsих District, Kwangsi, which is, in fact, the source of a large share of the

industrial bamboos sold in Canton. It is possible, however, that the material tested may have come from Ts'ung-hwa District, Kwangtung, where this bamboo is also known to be cultivated in some quantity.

In China, bamboo is commonly transported to market from the place of its origin by rafting, and is usually subjected to immersion in river water for a minimum period of several weeks. Upon reaching their destination, the rafts are often submerged completely for one or two months more by being weighted down with mud. The effect of this treatment is to cure the wood somewhat, and to increase considerably its resistance to the attacks of fungi and of powder-post beetles. This is accomplished presumably through the removal of certain nutritive substances by means of bacterial fermentation and leaching. The exact length of the period of submersion to which the present material had been subjected is not known but, judging from observable facts, in all probability it is not less than one month. The poles had been removed from the water for some days already when they were purchased. Some areas of the cortical tissue remained alive and green, while others were dead and brownish-gray in color. Care was exercised to select specimens representing a considerable range in size, in order to ascertain the relative efficiency of large and small culms.

Ordinarily it would be highly desirable to know the precise origin of the material tested, its age when cut, the length and the nature of the treatment to which it may have been subjected after cutting, the moisture content when tested, etc. In view of the urgency of the need for preliminary data, however, these bases for a thorough and scientific test of the bamboo had to be dispensed with.

In order to have a convenient unit for testing and for calculations, the culms were cut into one-foot lengths. The preliminary cuts were made by means of a carpenter's hand saw, care being exercised to avoid the splintering of the surface layer, and to make the cuts as nearly as possible at right angles to the theoretical axis of the stem. The ends were then further trimmed with a spoke-shave to bring them nearer to the desired angle with the axis. Finally, the two ends were made flat and as nearly parallel to each other as possible by means of a sand-paper disk operated by an electric motor.

The culms are naturally more or less geniculate at the nodes, that is to say, the whole culm is somewhat flexuous or zigzag in habit, the angles falling, roughly, in a single plane. The interior angle at each node occurs on the side opposite the branches, the successive branch clusters occurring in alternate arrangement, i.e., first on one and then on the other side of the culm (see fig. 1, A). Since the internodes of the lower portion of the culms of this bamboo, which alone is suitable for the intended purpose, are usually not more than a foot long, it was not possible, practically speaking, to secure

straight sections. The results here given represent, therefore, the actual crushing strength of the material as it comes from the market. This is, no doubt, considerably lower than would have been shown for straight sections of similar dimensions, since the load could not

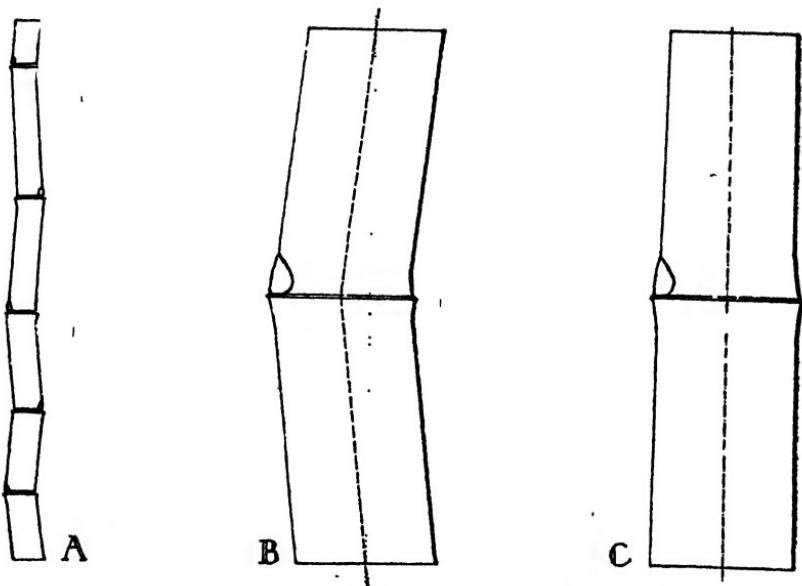


Fig. 1 A. A somewhat exaggerated indication of the zigzag nature of the culms as found in the market. B. Diagrammatic sketch of a portion of a portion of a culm, including a geniculate node, showing discrepancy between the real axis (broken line) and the axis of the lines of force (dotted line) as applied in the longitudinal crushing strength test. C. Sketch of a portion of a culm in which the node is straight (not geniculate) showing the coincidence between the real axis and the axis of the lines of applied force, a condition necessary to the delivery of the highest longitudinal crushing strength.

be balanced in perfect distribution in relation to the axis in any case, even though the end surfaces were parallel or nearly so (see fig. 1, B & C).

The angularity of the sections could have been reduced somewhat by first straightening the culms by means of heat and pressure. This was not considered desirable, however, since it probably is not feasible, from a practical point of view, to subject the culms to this treatment before using. This point should be settled, however, in subsequent tests, and by experiment, since the crushing strength of the culm would be increased considerably by bringing the real axis into closer coincidence with the axis of the thrust.

The measurements of the culm sections and the results of the tests are recorded in the accompanying table.

TABLE I
Measurements and crushing strength of culm sections

SECTION NUMBER	BASAL DIAMETER IN CENTIMETERS MAX. // MIN.	WALL THICKNESS IN CENTIMETERS MAX. // MIN.	WEIGHT SUPPORTED (LBS.) (LONGITUDINAL CRUSHING STRENGTH) BREAKING POINT // AFTER RUPTURE
Specimen A			
1	5.20-4.50	1.50-1.30	9,500
2	4.70-4.50	1.25-1.00	10,000
3	4.90-4.80	1.25-1.00	
4	5.10-5.10	1.45-1.25	
5	5.20-5.10	1.30-1.25	
6	5.00-5.00	0.80-0.75	8,285
7	4.90-4.90	0.70-0.60	
8	4.90-4.80	0.60-0.50	
9	5.00-4.90	0.60-0.50	
10	4.80-4.75	0.50-0.50	
11	4.75-4.65	0.50-0.50	
12	4.70-4.30	0.50-0.50	5,240
13	4.50-4.50	0.50-0.50	
14	4.20-4.20	0.50-0.40	
15	4.10-4.10	0.50-0.40	4,805
16	4.00-3.80	0.40-0.40	
17	3.75-3.70	0.30-0.30	3,500
18	3.60-3.50	0.30-0.30	
19	3.50-3.40	0.40-0.40	
20	3.20-3.10	0.35-0.35	
21	3.00-2.90	0.25-0.25	
22	2.70-2.60	0.35-0.35	2,710
23	2.40-2.40	0.45-0.40	660
Specimen B			
2	3.90-3.80	0.90-0.70	7,150
9	4.00-4.00	0.50-0.50	6,450
16	3.10-3.00	0.40-0.40	4,375
Specimen C			
1	5.60-5.50	1.80-1.60	14,595
2	5.50-5.50	1.50-1.40	15,050
3	5.40-5.20	1.20-1.20	14,300
4	5.50-5.50	1.00-1.00	12,745
5	5.40-5.40	1.00-1.00	12,355
6	5.50-5.50	0.90-0.90	11,695
7	5.40-5.40	0.90-0.90	11,600
8	5.30-5.30	0.80-0.70	11,310
9	5.40-5.30	0.70-0.70	9,250
10	5.30-5.30	0.60-0.60	9,140
11	5.20-5.10	0.70-0.60	8,930
			6,000

The maximum weight supported was 15,050 lbs. Thus the strongest section was C2, which had a diameter of 5.5 cm. (about $2\frac{1}{4}$ ") and an average wall thickness of 1.45 cm. (about $\frac{3}{4}$ "). It is a striking and significant fact that this section continued to support 11,650 lbs., even after the initial rupture had taken place. The weakest section tested was A22, which was 2.65 cm. (just over 1") in diameter, with walls but 0.35 cm. (about $3/16$ ") thick. This section supported 2,710 lbs. at the breaking point, after which it continued to support 660 lbs. Every section tested had a joint or node, with the exception of A12. There is no indication that its strength was greater or less than that to be expected from an examination of the other results.

In both specimens A and C, in which the basal section was tested, this section showed a lower crushing strength than the second section. It is probable that the chief reason for this is that the second section was straighter in both cases. It is possible, also, that the tissues of the base of every culm suffer somewhat from the strain undergone at the time of felling, and perhaps also, to a minor extent, from subsequent deterioration.

It is noteworthy that the bamboo culms tested behave very differently from the average of construction timber tested for longitudinal crushing strength, in that they retained a very considerable resistance even after the peak load had been reached and the primary rupture started. This fact is brought out by a comparison of the figures in the last two columns of the table. Excepting in very tough woods, the resistance drops, as a rule, very markedly after the primary rupture, according to tests made in the Laboratory here by Professor Wang Yu-wen. Furthermore, the line of rupture developed in the bamboo sections tested was not nearly so definite or strictly localized as that which develops in the average wood specimen under longitudinal compression. This may have been due in part to the uneven distribution of the load in relation to the axis of the culm which prevailed to a greater or lesser degree in every section tested. But it would seem reasonable to suggest the possibility that it may have been due in part to the peculiar mechanical structure of the bamboo culm, which is essentially a hollow, cable-like arrangement, of continuous, tough fibers (the fibro-vascular bundles) set in a flexible matrix of parenchyma cells. Very often the breakdown occurred at one or the other extreme of the section, through splitting. This suggests that the longitudinal crushing strength of sections of bamboo might be increased by protecting the ends by means of bands, or caps, in order to delay the development of the rupture of the tissues at these two weak points. In the case of a cement column reinforced with unsplit bamboo, the supporting action of the cement matrix would, conceivably, have such an effect, actually increasing the resistance of the individual bamboo reinforcing units beyond what they would show when standing unsupported.

These results are published as a preliminary report only. Their incompleteness and inadequacy is patent, and yet they are of considerable interest as giving the first indication we have of the approximate longitudinal crushing strength of any bamboo species from this area. Since bamboo continues to be used as a reinforcing material in cement construction, it is highly desirable that the species of promise in this connection should be tested for their mechanical properties. As suggested above, it is not sufficient to test the stock available on the market. Standardization of results should be attempted by using properly identified material from known sources and of known age, and whose subsequent history is definitely known. It is well confirmed that soil and other ecological factors often exert profound effects upon the physical and mechanical properties of wood, and it is not likely that bamboo is an exception. We already know, in a general way, the special adaptabilities of the various species of bamboo commonly in use in this area, but this knowledge is no longer sufficient to meet the needs of modern engineering. Specifications are becoming more exacting, and industrial materials must come up to definite standards.

Granting the suitability of bamboo as a material for reinforcing concrete, it seems to the writer that, in the interest of safety, we should know more about what takes place after the cement has been poured. What happens to the bamboo after the cement matrix sets and the moisture content drops? Does it shrink away from the matrix, and if so, how does this affect the strength of the complex? Is the resistance of the bamboo to attacks by fungi affected in any way by the covering of cement? If so, how? May wood-boring insects already in the wood be able to continue to work after having been imprisoned by the hermetical sealing of the bamboo in cement? What are the shortcomings of bamboo as a reinforcing material, and how may they be overcome by special treatment? May straightening the culms artificially add to their strength? May treatment with creosote or other substances overcome any tendency for the imprisoned culms to succumb to the development of fungi?

Acknowledgments

These tests were undertaken at the suggestion of Dr. E. P. Goodrich, Consulting Adviser to the Whampoa Port Development Administration.

Permission to make use of the equipment in the Testing Laboratory of the College of Engineering of Lingnan University was graciously extended by Dean Li Ch'üan-hsiang. The testing machine, an electrically powered unit of 50,000 lb. capacity, manufactured by Riehle Bros. of Philadelphia, was operated by Professor Huang Yu-wen of the staff of the Engineering College of Lingnan University. Mr. Li P'eng-fei assisted the writer during a part of the operations by making some of the measurements and recording and tabulating some of the results.

The Testing Laboratory of the College of Engineering of Lingnan University has been designated by the Ministry of Industries of the Chinese National Government as the official center for testing industrial materials used or originating in southern China.

花眉竹所能承受之直壓力之初步試驗

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(摘要)

普通用以建築之花眉竹，其特徵與 *Bambusa tuldaoides* Manro 者甚近。此試驗，乃將從市上買回之花眉竹，每枝分段切斷之，每段長一尺，後將各段，輪放於壓力機內，使壓力從頂端壓落，蓋欲試其能承受之壓力若干磅故也。試驗之結果，以第 C 號竹，近頭部之第二段受力最大，初裂時達 15,050 磅，裂後仍能承受 11,650 磅之壓力。此段竹之頭端其直徑為 5.5 毫，平均厚度為 1.54 毫。

A NEW SPECIES OF CEYLONOSTICTA FRASER FROM SOUTH CHINA (ODON.: ZYGOPTERA: COENAGRIIDAE).¹

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During my sojourn in China I had the occasion to study the Odonata of South China while employed by Lingnan University and it was during that time I made provisional determinations on an interesting Damselfly that apparently belonged to the Ceylonese genus *Ceylonosticta* Fraser. More recent studies have verified my earlier determinations and at this time I wish to describe the species as new.

It is indeed remarkable that a genus comprising seven known species all of which are strictly endemic to Ceylon, should be discovered in Kwangtung, South China. This strange zoogeographical phenomenon is at present difficult to interpret and will undoubtedly remain unexplained until the fauna of South China is more completely known and understood. It was just this unaccountable distribution that prevented earlier description of the species, but my recent studies have convinced me that the species pertains to the genus *Ceylonosticta*. As such it is the first record of the subfamily Platystictinae for China. At present this subfamily contains four genera, namely: *Protosticta* Selys 1885, *Platysticta* Selys 1860, *Ceylonosticta* Fraser 1933, and *Drepanosticta* Laidlaw 1917; these are arranged according to Fraser. The subfamily was formed by Laidlaw who postulated that the naiads when discovered would be found to be strikingly distinct from any known Zygopteran naiads. This assumption has been proven correct quite recently by Lieftinck in Java who has found the naiads of the Platystictinae quite unlike all other Odonata larval forms.

***Ceylonosticta brownelli* n. sp. (fig. 1, 2)**

A wholly black and slender species with the labrum and anteclypeus eburneous or ivory white and the legs yellowish-white in color.

Entire head deep black with dark reddish-brown eyes and ocelli with the basal two-thirds of the labrum and the anteclypeus eburneous; apical third of labrum piceous. Front of the face below the median ocellus shining black; vertex and occiput deep dull black. Labium and lower mouth parts reddish-brown; antennae dull testaceous.

Prothorax shining black with the anterior lobe dull ochreous buff. Synthorax entirely shining black with a dull white cuneiform marking, with the point down, about centrally placed on the

¹Contribution from the Lingnan Natural History Survey and Museum.

metepimeron. Sternites below blackish in front paling to testaceous caudad. Entire legs with the basal areas testaceous, darkening at the knees and on the outer surface of the tibiae to darker brown. Femoral spines or hairs moderately long; tibial spines very long and hair-like and medium brown in color.

Wings with 19 post-nodal nervures in fore and hind wings. Sector of the arc fused and arising from the base of the arc. Median sector (R₄ and 5) arising at the oblique nervure descending from the subnode and the subnodal sector (IR3) arising just beyond. Anal bridge (ab) present running from the proximal part of the quadrilateral or discoidal cell to meet the anal crossing (ac) just before reaching the posterior margin, leaving a very narrow space between it and the posterior margin in the fore wing and a much greater space in the hind wing. Pterostigma quadrilateral and black. All the veins straight except the distal portions of IR3 and the apical half of MA which are zigzag; IA is absent.

Abdominal segments 1 and 2 brownish-black; segments 3 and 4 brownish with the apical fifth brownish-black; 5 and 6 dark brownish-black with the basal fifth brown; 7 black with paler basal fifth and segments 8 to 10 and the anal appendages deep black. Superior anal appendages forcipate, with the apical portions somewhat decurved and spatulate, with a small nodular swelling about centrally placed

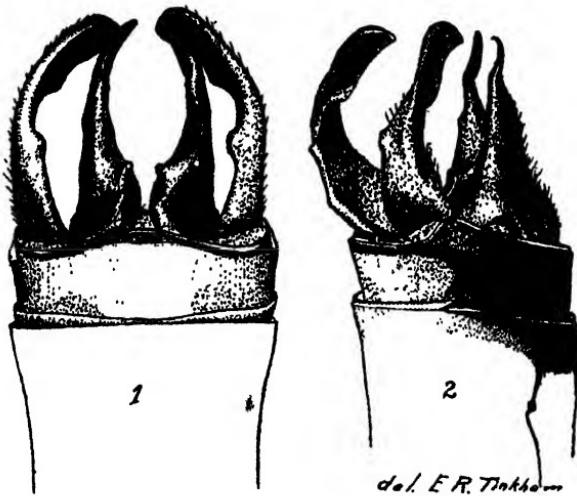


Fig. 1. Dorsal view of genitalia of *C. brownelli* n. sp.; fig. 2. dorso-lateral view.

on the inner dorsal edge. Inferior appendages as long as the superiors, seen in profile straight with the extreme tip slightly recurved; from above very stout at the base with a stout blunt tooth directed inward and upward at about the basal two-fifths; beyond

suddenly constricted and attenuate to the fine recurved apex. Penis with a dorsal ruff in front of the ramous apical hooks; this character differentiates *Ceylonosticta* from the closely allied *Drepanosticta*.

Type: 1 ♂, Kwangtung, South China, Tai-wa-tsz (Monastery), 5 miles NW. of Ts'ing-Yuen city, Ts'ing-Yuen District, July 28-29, 1935 (Chauncey W. Brownell). Measurements in millimeters: total body length 45.0; abdomen 38.5; forewing 27.5; hind wing 27.0. Type deposited in the Lingnan Natural History Survey and Museum.

Paratypes: 1 ♂, same data as the type. Measurements: total length 46.5; abdomen 39.5; fore wing 27.0; hind wing 26.0 mm. 1 ♂, Kwangtung, South China, Loh Fau Shan, Big Pool, elev. 2800 feet, July 24, 1935 (E. R. Tinkham; taken in dark woods on the steep north slope of a gorge where a small stream trickled under moss-covered rocks). Measurements: total length 49.0; abdomen 42.0; fore wing 28.0, hind wing 26.5 mm. In the Loh Fau specimen the median sector comes off just proximad to the oblique nervure descending from the subnode in the wings on the right hand side and just distad to the nervure in the wings of the left side.

The figures of the genitalia will serve to differentiate this species from any of the known forms.

Literature

FRASER, F. C.

1933. The fauna of British India, including Ceylon and Burma. Odonata vol I xiii and 423 p., 180 text fig., 1 map, Taylor and Francis, London.

LIEFTINCK, M. A.

1934. Notes on the genus *Drepanosticta* Laid., with descriptions of the larva and of a new Malayan species (Odon., Zygoptera). *Treubia* 14(1) 463-476, 5 text fig., pl. 9-10.

NEEDHAM, JAMES G.

1930. A manual of the Dragonflies of China. A monographic study of Chinese Odonata. *Zoologica Sinica*, Ser. A, Vol. 11, Fasc. 1, 344 and 11 (index) p., 2 text fig., 20 pl.

華 南 *Ceylonosticta* Fraser 之 一 新 種

(蜻蛉目：豆娘亞目：*Coenagrionidae*)

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(摘要)

本文發表粵產一新包氏豆娘 (*C. brownelli*), 在中國此屬亦為首次之記載。

A COMPARATIVE STUDY OF THE MUSCULATURE OF THE MALE GENITALIA IN SEVERAL SPECIES OF COLEOPTERA

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Verhoeff (1895) made a study of the musculature of the copulatory organ of *Triplax*. Muir (1919) studied the mechanism of the male genitalia of Coleoptera and gave a discussion of their musculature.

The present paper records the result of a study of the musculature of the male genitalia in seven species belonging to seven families of Coleoptera; they are *Calosoma* sp. (Carabidae), *Cybister japonicus* Sharp (Dytiscidae), *Hydrous scuminatus* Motsch. (Hydrophilidae), *Epicauta* sp. (Meloidae), *Oides decempunctata* Thunb. (Chrysomelidae), *Melanauster chinensis* Forst. (Cerambycidae) and *Anomala* sp. (Scarabaeidae).

Calosoma sp. (fig. 1, 2, 3, 4)

The abdomen consists of eight visible tergites, six visible sternites and two retracted segments. The lateral margin of the sternites of the retracted segments are modified into two bows (Verhoeff, 1893). One of the sternites of the retracted segments forms a large concave plate to enclose the ventrolateral part of the genitalia. The dorsal side of the genitalia is enclosed by a membrane attached to the bows. Under the ventral side of the retracted segment there is a partly sclerotized membrane for the attachment of muscles. The genitalia consists of a strong median lobe and a pair of asymmetrical lateral lobes. Apodeme and median struts are absent.

Protractors of median lobe: This is a pair of strong and long muscles each of which originates from the distal part of each lateral lobe, extending cephalad to insert on each side of the median foramen (fig. 1-4, 1).

Protractors of tegmen: These muscles consist of five single bundles of muscle fibers. All of them are attached to the right lateral lobe. (a) A bundle of long muscle fibers originates from the distal part of the right bow. It extends cephalad to insert on the proximal end of the right lateral lobe (fig. 3, 2). (b) A single long muscle originates from the distal part of the right bow near the origin of 2, extending cephalad to insert on the proximal part of the right lateral lobe (fig. 3, 3). (c) A single long muscle originates from the distal margin of the tenth tergite, extending cephalad to attach on the same insertion as that of 3 (fig. 3, 4). (d) A broad muscle originates from the proximal third of the left

bow, extending cephalo-mesad to insert on the proximal part of the left lateral lobe (fig. 2 & 3, 5). (e) A slender bundle of muscle fibers originates from the proximal part of the right bow, extending slightly mesad and slightly cephalad to insert on the proximal end of the right lateral lobe (fig. 1, 6).

Retractors of tegmen. A single muscle originates from the inner side of the proximal part of the partly sclerotized membrane, extending caudad to insert on the distal part of the right lateral lobe (fig. 2, 7). A powerful muscle originates along each side of the partly sclerotized membrane, extending slightly cephalad and convergently to insert on the proximal part of each lateral lobe (fig. 2 & 3, 8).

Adjustors of tegmen: A short muscle originates from the posterior part of the median foramen, extending caudad to insert on the proximal end of each lateral lobe (fig. 1-4, 9).

The dilator of the membrane which unites the bows is a single muscle which originates from the proximal part of the right bow, extending caudad to insert on the membrane near the distal end of the lateral lobe (fig. 2 & 3, 10).

Cybister japonica Sharp (fig. 5, 6, 7)

The abdomen consists of eight visible tergites and six visible sternites. The genital tube and its associated segments somewhat resemble those of *Calosoma* sp. The whole genitalia are partly enclosed by a broad sclerite of retracted segment. Two bows which rim the ventral broad sclerite of the retracted segment extend slightly upward to form an incomplete tube. The dorsal sides of the bows are joined by a membrane beneath which lie the genitalia. Beneath the incomplete tube there is a Y-shaped sclerite which is associated with the genitalia by muscles. Verhoeff (1893) recognized this sclerite as a compound structure: the single median sclerotized rod and two genitalganghaute. The distal halves of the lateral lobes are provided with long bristles. The distal part of the median lobe is divided into two separate processes.

Protractors of median lobe: A muscle originates from the proximal part of each lateral lobe, extending cephalad to insert on the proximal end of each median strut (fig. 5-7, 11). Two other muscles originate from the inner side of the proximal end of the lateral lobe, extending cephalad to insert on the proximal end of the median strut near the insertion of 11 (fig. 5 & 7, 12).

Protractors of tegmen: A muscle originates from the median part of each bow, extending cephalo-mesad to insert on the proximal end of each lateral lobe (fig. 5, 13). A pair of muscles originates from the proximal margin of the genitalganghaute of the Y-shaped sclerite; each one extends cephalad along each side to insert on the proximal end of each lateral lobe (fig. 5 & 7, 14).

Retractors of tegmen: One muscle originates from the proximal end of median sclerotized rod of the Y-shaped sclerite, extending caudad and divergently along each side of the genital tube to insert on the inner side of the proximal part of each lateral lobe (fig. 7, 15). Another muscle originates from the proximal margin of each bow, extending slightly cephalad and convergently to insert on the proximal end of the lateral lobe (fig. 5 & 7, 16).

Adjustors of lateral lobe: A short muscle originates from the proximal end of each median strut, extending caudad to insert on the proximal end of each lateral lobe (fig. 6, 17).

Protractors of Y-shaped sclerite: A pair of muscles originates from the lateral side of the middle part of the membrane which encloses the genital tube, extending cephalad to insert on the proximal end of the sclerotized rod (fig. 7, 18). A single muscle originates from the middle part of the left bow extending cephalad to insert on the left genitalganghaute (fig. 5, 19).

Retractors of Y-shaped sclerite: A short and strong muscle originates from the upper part of each bow extending caudad to insert on each genitalganghaute (fig. 5 & 7, 20).

Dilators of membrane which unites the bows: A muscle originates from the middle part of each bow, extending caudo-mesad to insert on the membrane which is attached to the two bows (fig. 5, 21). A single broad muscle originates from the middle part of the right bow, extending mesad to insert on the membrane (fig. 5, 22).

***Hydrous acuminatus* Motsch. (fig. 8, 9, 10, 11)**

The abdomen consists of eight visible tergites and five visible sternites. The segments 8-9 are telescoped from the posterior tip of abdomen and are associated with the genitalia. The basal piece of the genitalia is a flattened tube; its ventral and lateral portions are mostly sclerotized while its frontal wall is membranous. The lateral lobes are a pair of sclerotized plates which are broadly attached at base to the basal piece. The median lobe is placed between the lateral lobes. Its proximal end is differentiated into median struts. On the ventral side above the median lobe there is a sclerotized triangular band for the attachment of muscles. This band is attached to the proximal end of the median lobe by a piece of tough membrane. A sclerotized flagellum is situated on the ventral side of the distal end of the ejaculatory duct.

Protractor of genital tube: This is a long muscle which originates from the distal end of the ninth sternite, extending cephalad along the ventral side of the genital tube to insert on the proximal end of the basal piece (fig. 9, 23).

Retractors of tegmen: These consist of two pairs of muscles. Each pair is situated on one side of the basal piece. They commonly originate from the lateral side of the inner surface of the proximal

part of the ninth sternite. They extend slightly cephalad with one twisting upon another; the straight one is inserted on the latero-ventral side of the proximal end of the basal piece while the twisted one is inserted on the dorso-lateral side of the basal part of the basal piece (fig. 8 & 9, 24, 25).

Retractors of membranous tube: A muscle originates near the origin of each of the muscles 24 and 25 on each side of the proximal end of the ninth sternite, extending caudo-dorsad to insert on the distal end of the dorso-lateral part of the membranous tube near the proximal end of the lateral lobe (fig. 9, 26).

Adjustors of median lobe: A muscle originates along each lateral side of the inner surface of the proximal part of the basal piece, extending caudo-mesad and convergently to insert on the sclerotized triangular band and its adjacent membrane (fig. 8, 27).

Adjustors of lateral lobes: A smaller muscle originates from each lateral side of inner surface of the basal piece, extending caudad to insert on the proximal end of each lateral lobe (fig. 8, 28).

Adductors of lateral lobes: A very short muscle originates from the inner side of the proximal extremity of each median strut, extending inward to insert on the proximal part of the lateral lobe (fig. 10, 29).

Abductors of lateral lobes: A larger muscle originates from the outer side of the proximal extremity of each median strut, extending caudad and outward to enter the lateral lobe and insert on its distal part (fig. 10, 30).

Retractors of flagellum: These consist of a pair of muscles which originate along the inner surface of the lateral side of the proximal part of the median lobe, extending caudo-mesad to insert on the flagellum (fig. 11, 31).

Epicauta sp. (fig. 12, 13, 14, 15)

The abdomen consists of eight visible tergites, six visible sternites, and two retracted segments. The basal piece of genitalia is a broad piece and joins the lateral lobes on its distal margin. The lateral lobes are two tapering pieces with their basal portions fused to form a wedge-shaped incomplete ring in which lies the median lobe. The median strut is the proximal prolongation of the ventral wall of median lobe. There is a slit on the distal third of the ventral wall of the median lobe. A small chitinous lobe is protruded caudad through the slit. A developed apodeme is situated on the latero-ventral side of the genital tube.

Protractors of median lobe: This paired muscle originates from the inner surface of the common proximal end of the lateral lobes, extending parallelly and cephalad to insert on the dorsal side of the proximal end of the median strut (fig. 13 & 14, 32).

Retractors of median lobe: A strong muscle originates from the proximal extremity of the apodeme, extending caudad to insert on the ventral side of the proximal end of the median strut (fig. 12 & 14, 33). Another retractor originates from the same point but the insertion is on the dorsal part of the median foramen (fig. 14, 34).

Retractor of tegmen: A broad and long muscle originates from the inner side of the second retracted tergite, extending cephalad along the dorsal wall of the tegmen to insert on the proximal margin of the basal piece (fig. 12, 35).

Adjustors of lateral lobe: Two strong bundles of fan-shaped muscle fibers originate along the lateral side of inner surface of the proximal area of the basal piece, extending caudad and convergently to insert on the proximal part of the common base of the lateral lobes (fig. 13, 36).

Protractors of apodeme: A slender muscle originates from each side of the distal part of the last visible tergite, extending cephalo-ventrad to insert on each distal end of the apodeme (fig. 12, 37).

Retractor of small sclerotized lobe: A single muscle originates from the inner side of dorsal surface of the basal part of the median lobe, extending caudad to insert on the proximal end of the small sclerotized lobe (fig. 15, 38).

Oides decempunctata Thunb. (fig. 16, 17, 18)

The abdomen consists of seven visible tergites and five visible sternites and one retracted tergite. The genitalia are a long cylindrical tube, almost as long as the abdomen. The median lobe is fully developed, forming a cylindrical tube and is slightly bilobed at its tip. It is not differentiated into median struts. The tegmen is composed of a pair of lateral lobes which are reduced to form a pair of slender \wedge -shaped sclerotized rods under the median lobe. The apodeme is represented by a pair of slender sclerotized rods with the proximal ends united and is situated behind the tegmen under the median lobe. The ejaculatory duct in the median lobe is enlarged and thickly muscled in the middle part for the attachment of muscles. The median lobe is enclosed by a membranous tube which is supported by two bundles of retracted muscles. The retraction of this membranous tube causes the retraction of the median lobe and tegmen, and therefore no retractors of the median lobes of the tegmen are found.

Protractors of median lobe: A long muscle originates from the distal end of each lateral lobe, extending cephalad to insert on each side of the median foramen (fig. 16 & 17, 39).

Adjustors of median lobe: A muscle originates from each side of the proximal part of the median foramen, extending caudo-mesad to insert on the distal margin of the median foramen (fig. 17, 40).

Protractors of tegmen: A pair of muscles originates from the proximal end of the apodeme, extending cephalad to insert on the proximal end of the tegmen (fig. 17, 41).

Retractors of tegmen: A very short muscle originates from lateral side of the eighth tergite to insert on the distal end of each apodeme (fig. 16, 42).

Retractors of membranous tube: Two muscles originate from the proximal end of the apodeme and each extends caudo-laterad to insert on the membranous tube near the distal end of each lateral lobe (fig. 16 & 17, 43).

Compressors of the enlarged pouch of the ejaculatory duct: These consist of two long and powerful muscles. Each of them originates from the side of the median foramen, extending caudad into the median lobe. After making their attachment on the lateral sides of the enlarged pouch of the ejaculatory duct, they continue caudad to attach on the ventral side of the inner wall of the median lobe (fig. 17 & 18, 44).

Protractor of the enlarged pouch of ejaculatory duct: This is a single muscle which originates from the inner side of the ventral surface of the distal end of the median lobe, extending cephalad to insert on the enlargement of the ejaculatory duct. Its insertion meets the retractor muscle (fig. 18, 45).

Retractors of the enlarged pouch of the ejaculatory duct: A single muscle originates from the proximal end of the tegmen, extending caudad through the median foramen into the median lobe to insert on the ventro-lateral side of the enlarged pouch of the ejaculatory duct (fig. 18, 46).

***Melanauster chinensis* Forst. (fig. 19, 20, 21, 22)**

The abdomen consists of seven visible tergites, five visible sternites and one retracted segment. The genitalia consist of a tegmen and a median lobe. The former consists of a pair of lateral lobes, while the latter is differentiated into two median struts at its proximal portion. An apodeme is present on the ventral side of the genital tube. The last visible sternite is folded inward from its posterior margin to form three spiculae for the attachment of muscles.

Protractors of median lobe: A long and large muscle originates from an expansion of the posterior part of each lateral lobe, extending cephalad along each side of the genital tube to insert on the proximal extremity of each median strut (fig. 19, 47).

Retractors of median lobe: There are two long muscles which originate from the proximal end of the tegmen, extending caudad and side by side to enter the median lobe. The insertion is on the inner surface of the distal part of the median lobe (fig. 21 & 22, 48). Another pair of retractors also originates from the proximal ends of

the tegmen, extending curvately caudad with each one inserted on the inner side of dorso-lateral wall of the middle part of the median lobe (fig. 19 & 21, 49).

Protractors of tegmen: A single long muscle originates from the base of forks of the apodeme, extending cephalad along the ventral side of the genital tube to insert on the proximal part of the tegmen (fig. 19, 50). Another protractor originates from the proximal end of the apodeme, extending cephalo-mesad to insert also on the proximal part of the tegmen (fig. 19, 51).

Retractors of tegmen: A pair of muscles originates from the proximal end of the apodeme, extending caudad divergently to insert on the distal end of each lateral lobe (fig. 20, 52).

Retractor of internal sac: A bundle of thin muscle fibers originates from the proximal end of the tegmen, extending caudad through the median foramen to insert on a sclerotized portion of the internal sac (fig. 22, 53).

Adjustors of lateral lobe: A muscle originates from the inner margin of the terminal part of each median strut, extending caudad to insert on the proximal end of the tegmen (fig. 19 & 21, 54).

Protractor of apodeme: A single muscle originates from the lateral spiculum of the last visible sternite, extending cephalo-mesad to insert on the anterior part of the apodeme (fig. 20, 55).

Retractors of apodeme: A pair of muscles originates from the median spicula of the last visible sternite, extending caudad to insert on each distal end of the apodeme (fig. 19 & 20, 56). A very short muscle originates on each side of the first retracted tergite to insert on the distal end of each apodeme (fig. 19, 57).

Anomala sp. (fig. 23, 24, 25)

The abdomen consists of eight visible segments. The genitalia form a large cylindrical tube. The basal piece forms a tambour which is divided into two parts by a transverse suture. The ventral surface of the proximal part of the tambour is hollowed out while that of the distal part is enclosed by a ventral piece, which is connected with the other part of the tambour by tough membrane. In front of the ventral piece is a transverse sclerotized band. The lateral lobe is much shorter than the basal piece. The median lobe is poorly developed; its proximal part is a concave slender piece while the distal part is membranous and forms a fleshy tube. There is an apodeme on the latero-ventral side of the genital tube; its distal margin is attached to a small bristled transverse sclerotized piece.

Protractors of median lobe: Two long muscles originate from the dorsal side of the inner surface of the distal end of the tambour, extending cephalad and convergently to insert on the proximal end of the median lobe (fig. 25, 58).

Retractors of median lobe: A large muscle originates along the inner surface of each side of the proximal part of the basal piece,

extending caudad to insert on the middle portions of both dorsal and ventral surface of the median lobe (fig. 23, 59).

Protractor of tegmen: A single long muscle originates near the apodeme from the membrane which encloses the genital tube, extending cephalad to insert on the proximal end of the tambour. Its origin appears to be separated into two bundles of muscles in some individuals (fig. 20, 23 & 24, 60).

TABLE 1

Number of various muscles of the male genitalia of seven species of Coleoptera

	CALOSOMA SP.	CYBISTER JAPONICA	HYDROUS ACUMI- NATUS	EPICAUTA SP.	OIDES DECIMPUN- CTATA	MELAN- AUSTER CHINENSIS	ANOMALA SP.
Protractors of genital tube			1				
Protractors of median lobe	2	4		2	2	2	2
Adjustors of median lobe			2		2		
Retractors of median lobe				2		4	2
Protractors of tegmen	5	4	4		2	2	1
Retractors of tegmen	3	4		1	2	2	
Adjustors of lateral lobe	2	2	2	2		2	
Adjustors of distal portion of tambour							2
Dilators of membrane which unites the bows	1		3				
Protractors of Y-shaped sclerite			3				
Retractors of Y-shaped sclerite			2				
Retractors of membranous tube				2		2	
Adductors of lateral lobe				2			
Abductors of lateral lobe				2			
Retractors of flagellum				2			
Protractors of apodeme				2		1	
Retractors of apodeme						4	2
Laterotracitors of apodeme							2
Retractors of small sclerotized lobe				1			
Compressors of enlarged pouch of ejaculatory duct					2		
Protractors of enlarged pouch of ejaculatory duct					1		
Retractors of enlarged pouch of ejaculatory duct					1		
Retractors of internal sac						1	several

Adjustors of distal division of tambour: A muscle originates from each side of the distal end of the proximal division of the tambour, extending caudo-mesad to insert on the sclerotized band in front of the ventral piece of the distal division of the tambour (fig. 23, 61).

Latero-tractors of apodeme: These consist of two muscles, each of which originates from the membrane which surrounds the genital tube, extending laterad to insert on the distal end of the apodeme (fig. 24, 62).

Retractors of apodeme: A long and strong muscle originates from each side of the proximal part of the inner surface of the last visible tergite, extending caudad to insert on the extremity of the lateral arm of the apodeme (fig. 24, 63).

Retractors of internal sac: These consist of several bundles of muscles. They originate from the proximal part of the median lobe, extending caudad to insert on several points of the proximal part of the internal sac (fig. 25, 64).

Résumé

1. The musculature of the male genitalia of seven species belonging to seven families of Coleoptera was studied. The species are *Calosoma* sp. (Carabidae), *Cybister japonica* Sharp (Dytiscidae), *Hydrous acuminatus* Motsch. (Hydrophilidae), *Epicauta* sp. (Melyoidae), *Oides decempunctata* Thunb. (Chrysomelidae), *Melanauster chinensis* Forst. (Cerambycidae) and *Anomala* sp. (Scarabaeidae).

2. The protractors of median lobe, protractors of tegmen, retractors of tegmen and adjustors of lateral lobe are present almost constantly in male genitalia of Coleoptera. Many peculiar muscles were found in the genitalia of different species.

3. The apodeme when present plays an important rôle in the attachment of muscles.

4. The more the terminal segments are retracted, the more complicated is the attachment of muscles.

Literature

MUIR, F.

1920. On the mechanism of male genital tube in Coleoptera. *Trans. Ent. Soc. London* 1919 : 404-414, 1 pl.

SHARP, D. AND MUIR, F.

1912. The comparative anatomy of the male genital tube in Coleoptera. *Trans. Ent. Soc. London* 1912 : 477-642, 37 pl.

SNODGRASS, R. E.

1935. Principles of insect morphology. ix and 667 p., 319 fig., McGraw-Hill Book Co., New York.

VERHOEFF, C.

1893. Vergleichende Untersuchungen über die Abdominal-segmente und die Copulationsorgane der männlichen Coleoptera, ein Beitrag zur Kenntniss der natürlichen Verwandtschaft derselben. *Deut. Ent. Zeitschr.* 1893 : 113-170, 4 pl.

1895. Vergleichend-morphologische Untersuchungen über das Abdomen der Endomychiden, Erotylidien und Languriiden (im alten Sinne) und über die Muskulatur des Copulationapparates von *Triplax*. *Arch. Naturg.* 41 : 213-287, 2 pl.

Explanation of Plates

- Fig. 1. Ventral view of genitalia and retracted abdominal segments of *Calosoma* sp.
- Fig. 2. Dorso-lateral view of genitalia and retracted abdominal segments of *Calosoma* sp., the right side being partly removed.
- Fig. 3. Dorsal view of genitalia and retracted abdominal segments of *Calosoma* sp.
- Fig. 4. Ventral view of genitalia of *Calosoma* sp.
- Fig. 5 Dorsal view of genitalia and retracted abdominal segments of *Cybister japonica*.
- Fig. 6. Ventral view of genitalia of *Cybister japonica*.
- Fig. 7. Lateral view of genitalia of *Cybister japonica*.
- Fig. 8 Dorsal view of genitalia of *Hydrous acuminatus*.
- Fig. 9. Ventral view of genitalia and retracted abdominal segments of *Hydrous acuminatus*.
- Fig. 10. Dorsal view of median lobe and lateral lobes of *Hydrous acuminatus*, proximal parts of lateral lobes being removed.
- Fig. 11. Ventral view of median lobe of *Hydrous acuminatus*, ventral wall being removed.
- Fig. 12 Lateral view of genitalia of *Epicauta* sp.
- Fig. 13. Ventral view of genitalia of *Epicauta* sp.
- Fig. 14. Lateral view of median lobe of *Epicauta* sp.
- Fig. 15 Lateral view of median lobe of *Epicauta* sp showing the small sclerotized lobe.
- Fig. 16. Lateral view of genitalia of *Oides decempunctata*.
- Fig. 17. Ventral view of genitalia of *Oides decempunctata*.
- Fig. 18 Lateral view of genitalia of *Oides decempunctata* showing the muscles within the median lobe.
- Fig. 19. Ventral view of genitalia of *Melanauster chinensis*.
- Fig. 20. Lateral view of genitalia of *Melanauster chinensis*.
- Fig. 21. Ventral view of genitalia of *Melanauster chinensis*, lateral lobes being partly removed.
- Fig. 22. Lateral view of incomplete median lobe of *Melanauster chinensis* showing the muscles within it.
- Fig. 23. Ventral view of genitalia of *Anomala* sp.
- Fig. 24. Latero-ventral view of genitalia of *Anomala* sp.
- Fig. 25. Lateral view of median lobe of *Anomala* sp.

Explanation of Abbreviations

apd	—apodeme	ll	—lateral lobe
b	—bow	lsp	—lateral spicula
bp	—basal piece	stn	—sternite
ejd	—ejaculatory duct	ssl	—small sclerotized lobe
mf	—median orifice	ter	—tergite
ml	—median lobe	tm	—tambour
ms	—median strut	vp	—ventral plate
msp	—median spicula		

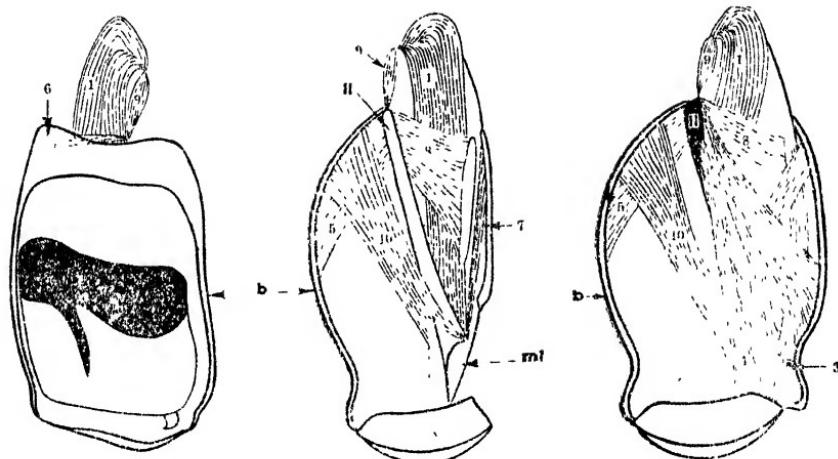
數種鞘翅目其雄性生殖器之筋肉組織之比較研究

蒲 驥 龍 著

中山大學農學院昆蟲部

(摘要)

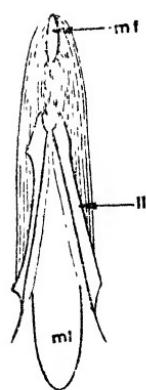
本文描述及附圖表明下列七種甲蟲其雄性生殖器之筋肉組織：*Calosoma* sp. (步行虫科), *Cybister japonica* Sharp (龍蝨科), *Hydrous acuminatus* Motsch. (牙虫科), *Epicauta* sp. (芫菁科), 十星金花虫 (金花虫科), 星天牛 (天牛科), 及 *Anomala* sp. (金龜子科)。



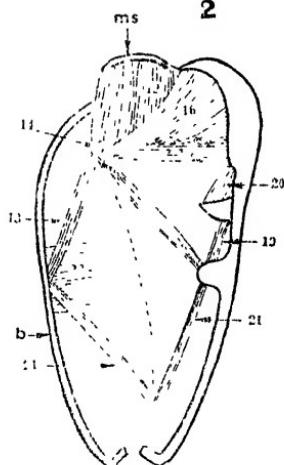
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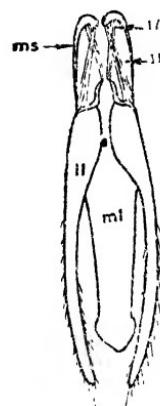
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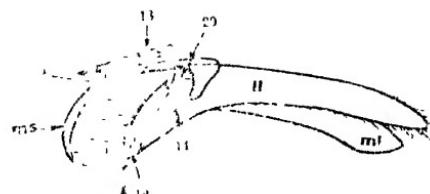
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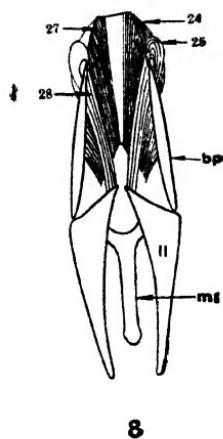
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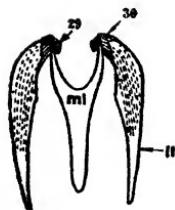
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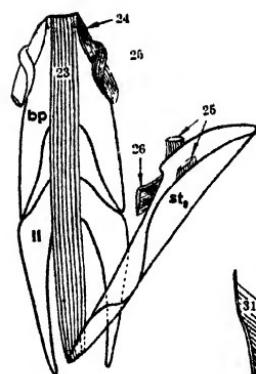
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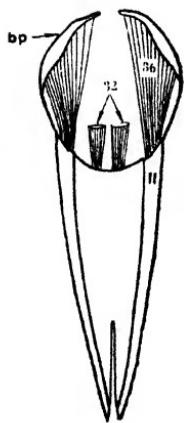
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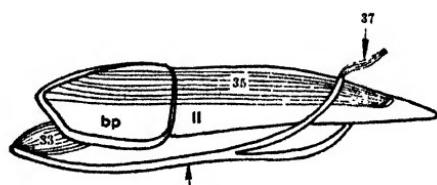
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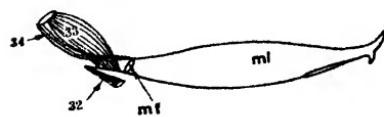
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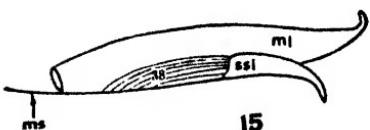
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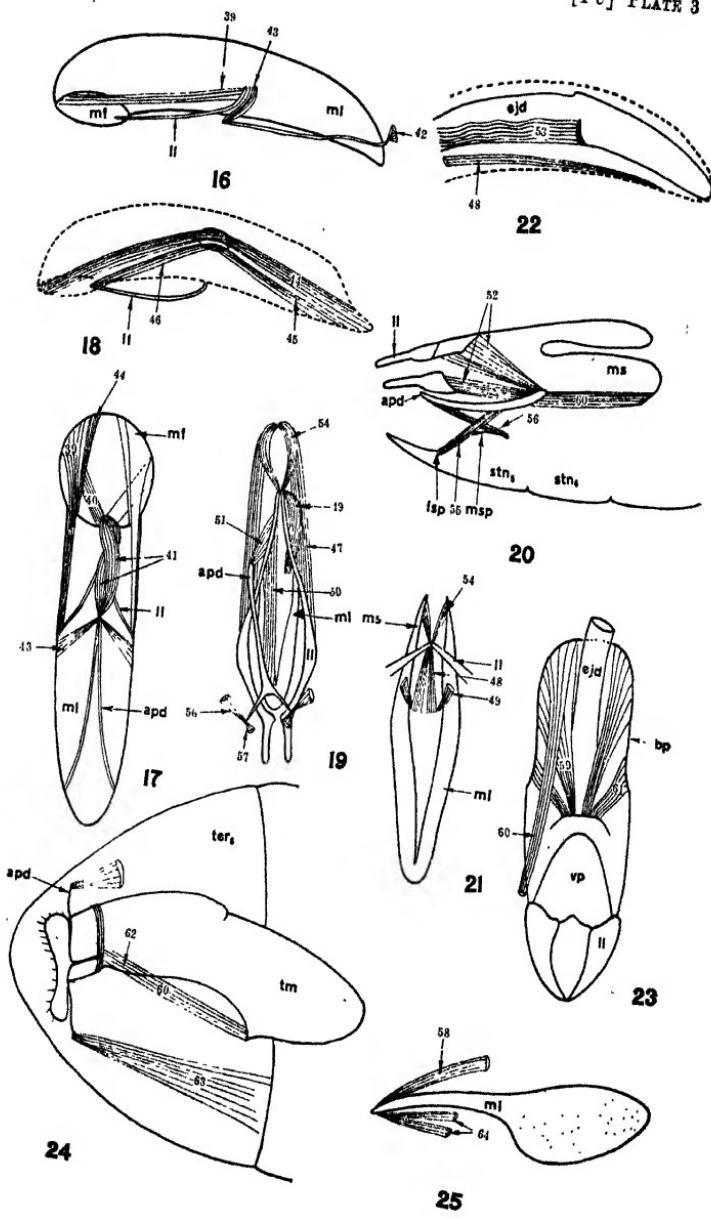
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FURTHER NOTES ON SCIAENID FISHES OF CHINA

By S. Y. LIN

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The Sciaenid fishes of the China region, including Japan, have been partly studied by Wang (1935), Lin (1935), Tang (1937), and Matsubara (1937), besides the excellent contributions of Fowler (1933) and Weber and de Beaufort (1936). Wang described eleven species from Shantung, of which two were new to science, namely, *Nibea pingi* (= *Nibea nibe* Jordan & Thompson) and *Othonias brevirostris* (= *Pseudosciaena manchurica* Jordan & Thompson). His description of *Nibea miuy* (*miuy*, misprinted) establishes *Sciaena miuy* of Basilewsky as a valid species. Lin in his short notes on some important Sciaenid fishes of China adds a new species, *Nibea flavolabiata*, to Chinese ichthyofauna. In Tang's article "A Study of Sciaenoid Fishes of China," three new species, namely, *Pseudosciaena tingu*, *P. acuta* and *P. macrocephalus* are described. Matsubara bases his study on a large number of specimens and employs the statistical method to determine the extent of variation of each species. His rediscovery of *Sciaena japonica* Schlegel near Tokyo is interesting and valuable. In the months of November and December 1936 and February 1937, I found three specimens of this fish in the Chusan market, one 942 mm. long being retained for a mounted specimen, and two 1020-1032 mm. long being identified in the field. It is interesting to note that only large individuals of this rare fish are known in Chinese and Japanese seas and it would certainly be worthwhile to locate the young and the places of rendezvous. *Sciaena japonica* is closely allied to *Labrus hololepidotus* (Lacépède) and in most essential characters they are even identical as noticed by Schlegel. The works of Fowler and Weber and de Beaufort are valuable but not confined to Chinese and Japanese fishes alone. Among the works mentioned above, opinions as to the taxonomic system of genera vary to a considerable extent. In fact the subject is still open for further study.

Since 1935 when I first published my short notes on Chinese Sciaenids many more specimens have been received from various sources. It is deemed necessary therefore to study the materials altogether and to place the results on permanent record.

In order to show better relationship between species I have used the number and arrangement of pores on the chin in combination with other characters as bases to group all the species examined by me under 10 genera. The pores below the symphysis of the mandible are divided into two main types. In one type the pores are small, obsolete and arranged in pairs; in the other the pores are conspicuous and unpaired. Large oblique mouth with lower jaw equal to or

slightly longer than upper jaw is usually provided with the first type of pores, while the small inferior mouth with lower jaw included always possesses pores of the second type. Specification of the mouth-parts, especially the pores, usually implies ecological variation of habit and feeding.

My sincere thanks are due to Mr. Tse Yu Kwang of the Fisheries Experiment Station, Canton, who constantly supplied me specimens from Kwangtung, to Dr. Keitaro Uchida of the Fisheries Experiment Station of Chosen for sending me five excellent specimens from Fusau and to Dr. T. H. Cheng of Fukien Christian University for sending me many specimens from Foochow. I also wish to thank Dr. Y. T. Chu of St. John's University and Mr. S. Kimura of Shanghai Science Institute who secured for me some rare literature.

Analytical Key to Genera

1. Soft anal ray 11-13; soft dorsal rays 24-29; vertex of head with a median spinous bony ridge, obsolete in mature specimens; head large; mouth large, strongly oblique, with lower jaw more or less projecting. Interorbital strongly convex; eyes small; dentation weak, no enlarged series; tail slender; body covered by cycloid scales all over; soft dorsal and anal densely covered by small cycloid scales. Pores on chin indistinct or absent **Collichthys**
- Soft anal rays 10 or less, rarely 11, anal axilla opposite to the 10-12th dorsal ray counting from dorsal axilla. Spiny ridge on head present or not in young specimens 2
2. Strong canines in front of both jaws; mouth slightly oblique with lower jaw projecting; no pores or barbels on chin : **Otolithes**
No distinct canines; pores present on chin 3
3. Mouth large, oblique or not, with paired pores on chin, 2, 4, or 6 in number; no central pore below mandibular symphysis; barbel absent; jaws equal in front or the lower slightly projecting 4
Mouth small, inferior or subterminal; 5 large distinct pores on chin, the median one always large and circular, with or without a fleshy, flat and smooth warty in it. This fleshy warty sometimes elongate to form a short stout barbel. Rostral fold lobate 7
4. Mouth large, with jaws equal in front or the lower slightly projecting. Soft dorsal and anal densely scaly at least one-third the way up the fins 5
Mouth terminal. Only one or two rows of small scales forming a narrow sheath at base of soft dorsal and anal 6
5. Head large, broadly blunt; mouth strongly oblique; dentation rather weak. Soft dorsal and anal densely covered by small cycloid scales. Gillrakers long and slender, 17-20, on lower branch of the anterior arch. Dermal glandular organs present; depth of body 3.3-3.8 in length; tail slender. Dorsal IX-X/1/31-37; anal II/8-10. Young with bony ridge on head **Pseudosciaena**
Head pointed, mouth somewhat horizontal; dentation strong, enlarged teeth more or less canine-like. Soft dorsal and anal with broad and densely scaly sheath at base. Gillrakers short and stout, less than 15 on lower branch of anterior arch; dermal glandular organ absent; depth of body 4.4.5 in length. Dorsal IX/1/28-29; anal II/7. Coloration dark gray. **Miichthys**

6. None or two small pores on chin. Dorsal VII/1/22-24. Fish attain large size *Bahaba*
- Two to six distinct pores on chin. Dorsal IX-X/1/26-32..... *Argyrosomus*
7. A fleshy tubercle in the median pore below mandibular symphysis elongate to form a single barbel *Sciaena*
The fleshy flat tubercle in the median pore present or absent, never elongate to form a barbel .. 8
8. No enlarged, conical teeth on mandible; snout very prominent. Soft dorsal and anal thinly covered by small cycloid scales..... *Johnius*
Inner row of mandibular teeth enlarged and more or less conical; soft dorsal covered by scales or not .. 9
9. Soft dorsal and anal thinly covered by small cycloid scales, one-third or half way up; second anal spine usually very strong .. . *Wak*
Soft dorsal and anal naked in adult, usually only one or two rows of small scales covering base of soft dorsal .. . *Nibea*

Analytical Key to Common Young Sciaenids Found in the Coastal Waters of Chekiang¹

1. Occiput of head smooth. No dermal glandular organ on side of body below lateral line Vertebrae 25-26 2
Occiput of head with spinous ridge. Conspicuous dermal glandular organs present, one below each scale below lateral line Vertebrae 26-30. . 3
2. Ground color of body silvery, usually two horizontal series of five or six oblong blotches, one series immediately below dorsal profile extending from nape to base of caudal, one along lateral line. These markings sometimes indistinct. A bluish dark opercular speck; spinous dorsal dusky to black; other fins pale. Mouth oblique, with jaws subequal, lower slightly included. Gillrakers 4+9-10 Dorsal X/1/27-29; anal II/7-8 Length 15-78 mm. *Argyrosomus iharae*
Ground color of body gray to dusky with silvery bluish reflection; two faintly dark bands on back, one immediately below dorsal, one along lateral line: opercular blotch small; edge of spinous dorsal and distal portion of the lanceolate caudal black (this is the most conspicuous character in distinguishing the species from *A. iharae*). Mouth oblique, jaws equal in front, the lower projecting when the mouth is open. Gillrakers 4+10-12. Dorsal X/1/28-30; anal II/7-8. Length 17-95 mm. *Miichthys miiuy*
3. Anal II/11-13, its axilla nearly opposite to dorsal axilla. Dorsal VII-IX/1/24-30. Young usually above 35 mm. in length..... 4
Anal short, II/7-10, ending far before dorsal axilla; anal axilla opposite to space between 15th to 20th soft dorsal ray. Size from embryonic larvae upward 5
4. Occipital ridge prominent with anterior and posterior spines only, the space between spines more or less concave and smooth, never with conspicuous sharp spines; branchial cavity black above; eye of moderate size, 4½ to 5 in head length. Dermal glandular spots on ventral surface of body large. Dorsal VIII/1/23-25. Length usually 60-75 mm. *Collichthys niveatus*
Occipital ridge with base usually concealed in skin, the middle portion of which is concave and broken up into 2 to 3 small sharp and distinct

¹ There are several kinds of young Sciaenids which appear considerably different from their relative adults. This additional key to the young should be of some service to one who fails in identification with other keys in the present paper.

- spines; branchial cavity nearly white all over. Eye small, 4.2-7 in head, usually 5-7. Dermal glandular spots large, but not so brightly yellow and conspicuous as in *niveatus*. Dorsal VII-IX/1/25-30, usually VIII/1/26-27. Length 35-110 mm. *Collichthys lucida*
5. Occipital ridge rather long with 4 spines, the anterior spine usually long and projecting forward; anal II/8, rarely 9; second anal spine long, 2.3-3.1 in head; vertebrae 26. The hatching larvae are found in great abundance at the end of June and the beginning of July; the fry and fingerlings from July to October *Pseudosciaena crocea*
- Occipital ridge short, small, with rudimentary or no spines; anal II/9-10; second anal spine short, 3.4-4.3 in head; vertebrae 28-30. Length 15-85 mm. Extremely abundant in June to August *Pseudosciaena manchurica*

Collichthys Günther

Collichthys Günther, 1860, Cat. Fish. Brit. Mus. 2:312. Type: *Sciaena lucida* Richardson, designated by Jordan & Eigenmann, 1886 [1889], Rept. U. S. Fish. Comm. pt. 14, p. 348.

Oblong, compressed; head very large, peduncle slender; snout broadly round with profile arched. Interorbital very broad and convex. Eyes small, situated in anterior half of head and above the level of commencement of mouth cleft. Bones of head cavernous. A spiny ridge present on the vertex of young specimens, but becoming obsolete with age. The whole body covered by cycloid scales. Mouth strongly oblique with the lower jaw slightly projecting beyond the upper jaw. Teeth small, in more or less villiform bands in jaws, no enlarged rows; vomer and palate edentate. No distinct pores at chin; intermaxillary protractile downward. Preopercular limbs finely spinate; tip of the spines scarcely extending beyond membrane; operculum terminating in a weak, flexible point. Branchiostegals 7. Gillrakers long and closely set, 10+17-20. Pseudobranchiae present. Dorsal VII-IX/1/24-30; anal II/11-13; anal axilla nearly opposite to that of soft dorsal; the second anal spine weak, caudal lanceolate. Vertebrae 27-28. Mouth cavity and peritoneum silvery. Part of body below lateral line provided with dermal glandular organs, one below each scale. They are very large and distinct in some species.

Abundant in Korea and in all Chinese coastal waters. It was once recorded by Elera, 1895, from Luzon (Manila) of Philippines.

Remarks: Fowler's opinion (1933) that *Collichthys lucida* Günther and *Laramichthys rathbunae* Jordan and Starks are synonyms of *Sciaena lucida* Richardson, which has been wrongly followed by Ling (1935) and Tang (1937), cannot be accepted here. As Günther had taken and described a young specimen of *Otolithus biauritus* (or most probably a young of *Pseudosciaena crocea*) and wrongly placed it under the genus-name *Collichthys*, which name he created to receive *Sciaena lucida* Richardson including *biaurita* (Zool. Record, Pisces, 1886, p. 143), and Bleeker, neglecting Günther's intention, established *Hemisciaena* for *Sciaena lucida* Richardson, it is obvious that *Hemisciaena* should be synonymous with *Collichthys*. *Laramichthys rathbunae* differs from *Collichthys lucidus* in many essential characters and seems superficially to be a young of

Pseudosciaena manchurica. With this point in view I am of the opinion that *Laramichthys* should be a synonym of *Pseudosciaena* rather than of *Collichthys*.

Synopsis of Chinese Species of *Collichthys*

1. Occipital ridge prominent with anterior and posterior spines only, the space between spines more or less concave and smooth, never with conspicuous sharp tubercles; branchial cavity black above; eye of moderate size, $4\frac{1}{2}$ to 5 in head. Large dermal glandular spots on ventral surface of body. Dorsal VIII/1/23-25. *niveatus*
2. Occipital ridge with base usually concealed in skin, the middle portion of which is concave and broken up into 2 to 3 small sharp and distinct spines; branchial cavity nearly white all over. Eye small, 4.2-7 in head, usually 5-7. Large glandular spots present but not so conspicuous as in *niveatus*. Dorsal VII-IX/1/25-30, usually VIII/1/26-27.... *lucida*

Collichthys niveatus Jordan & Starks

Collichthys niveatus Jordan & Starks, 1906, Proc. U. S. Nat. Mus. 31: 519, fig. 2 (type locality: Port Arthur, Manchuria); Jordan & Metz, 1913, Mem. Carnegie Mus. 6(1):39, fig. 31 (Chinnampo and Port Arthur); Sowerby, 1930, The Naturalist in Manchuria 4:190 (compiled); Chu, 1931, Index Pisc. Sinen. p. 135 (compiled); Reeves, 1933, Man. Vert. Animals p. 424 (copied); Mori & Uchida, 1934, Jour. Chosen Nat. Hist. Soc. No. 19, p. 14 (Chinnampo).

D. VIII/1/23-24; A. II/12-13. Depth in length 3.2-3.3; head 3.2-3.5. Eye in head 5-5.2; snout 3.6; postorbital space 2; interorbital 2.5; peduncle length 1.1; its depth 3.8; second anal spine 7.1 in head and 1.4 in eye diameter. Eye 17.4 in length.

Oblong compressed, with the anterior half of body large and peduncle slender. The dorsal profile is high and gently arched reaching its highest curvature at the beginning of spinous dorsal. Head large, interorbital space broad and convex. Mouth wide, strongly oblique, with the jaws equal in front or the lower slightly projecting when the mouth is open. Maxillary extends slightly behind the vertical from hind margin of orbit. A mandibular knob with 2 or 3 small sharp teeth. No visible pores at chin. Teeth on jaws minute, in narrow bands, devoid of enlarged series. Only 2 or 3 on mandibular symphysis slightly enlarged and curved backward. There are 2 series in front of mandible and one single series behind, all teeth slightly curved backward. Premaxillary teeth in band of several series, the outer series slightly enlarged in front but never becoming conspicuous. Vomer and palate edentate. The absence of the enlarged and strongly curved inward teeth in premaxillary of *Collichthys niveatus* and *C. lucida* constitutes one of the most important characters by which they can be distinguished from the young of *Pseudosciaena crocea* and *P. manchurica*. The outer series of premaxillary teeth of the latter is conspicuously enlarged. Tongue sharply round and free in front. The bone of head cavernous covered by very thin skin through which the edge of bone is usually exposed. The occipital ridge provided with 2 prominent

anterior and posterior spines, the anterior being longer. Between the spines the crest is mostly perfectly smooth and concave in adult specimens (about 87 mm. to base of caudal), but in younger specimens, the concave surface is provided with one or two very low or minute tubercles. Eyes of moderate size. Preopercle slanting gently backward with round angle, provided with distinct serrae, which scarcely extend beyond the membrane. Gillrakers 9+18-18, closely set, longer than filaments, longest equals eye diameter. Pseudobranchiae. Branchiostegals 7. Mouth cavity white, branchial cavity black above gillarch. Spinous dorsal with a broad, deep notch nearly to base. Base of spinous dorsal contained about 2 times in soft dorsal. Anal commencing below 11th soft dorsal ray and ending below 23rd ray. Caudal lanceolate, middle ray elongate. Scales were lost in all the specimens examined. Vertebrae 27. Peritoneum white.

Yellowish with golden reflection. All fins white. Large roundish dermal glandular organs, reddish-yellow in color, present on thorax and abdomen. A row of large glandular spots behind gill-opening just below pectoral base, the median row extending from anterior end of isthmus through and above ventral base to anus. A row running along anal base to caudal.

Eight specimens 50-87 mm. long to base of caudal taken from the bag nets of Chusan. Although they are not caught in large quantity 1 or 2 specimens are commonly seen in each bag net along Chusan Islands during the months of April, May and June. Fish about 85 mm. long are usually found with mature milt and roe.

Collichthys lucida (Richardson)

Sciaena lucida Richardson, 1844, Voy. Sulph. Ichth. p. 87, pl. 44, figs. 3-4 (type locality: China Sea); 1846, Ichth. China, Japan p. 224 (China Sea, Chusan, Ningpo, Canton).

Coilichthys lucida Gunther, (part) 1860, Cat. Fish. Brit. Mus. 2:312 (China; Chusan); 1866, Zool. Record, Pisces p. 143 (note); Steindachner, 1866, Verh. zool.-bot. Ges. Wien 16:475 (Hong Kong); Bleeker, 1870, Versl. Med. Akad. Amsterdam ser. 2, 4:252 (China); Karoli, 1881, Term. fizetek, Budapest 5:160 (Canton); Schmeltz, 1881, Cat. Mus. Godeffroy No. 8, p. 5 ("Surinam" error); Jordan & Eigenmann, 1886[1889], Rept. U. S. Fish. Comm. pt. 14, p. 348 (Swatow); Elera, 1895, Cat. Fauna Filip. 1:503 (Luzon: Manila); Rutter, 1897, Proc. Acad. Nat. Sci. Phila. p. 77 (Swatow); Chu, 1931, Index Pisc. Sinen. p. 135 (compiled); Reeves, 1933, Man. Vert. Animals p. 423 (copied).

Collichthys lucidus Martens, 1876, Preussische Exped. Oest-Asien p. 390 (Shanghai); Jordan & Starks, 1905, Proc. U. S. Nat. Mus. 28:204 (Korea); Jordan & Metz, 1913, Mem. Carnegie Mus. 6 (1):38 (Korea); Fowler & Bean, 1920, Proc. U. S. Nat. Mus. 58:315 (Sonchow); Evermann & Shaw, 1927, Proc. Calif. Acad. Sci. ser. 4, 16:117 (Wenchow); Fowler, 1929 [1930], Proc. Acad. Nat. Sci. Phila. p. 596 (Shanghai), p. 610 (Hong Kong); 1931, Hong Kong Nat. 2 (4):302 (Hong Kong); 1933, U. S. Nat. Mus. Bull. 100:12:362 (China; Korea).

Hemisciaena lucida Bleeker, 1865, Nederl. Tijdschr. Dierk. Amsterdam 2:56 (Amoy); Sauvage, 1881, Bull. Soc. Philom. Paris ser. 7, 5:106 (Swatow).

Sciaenooides lucidus Steindachner, 1893, Sitz.-ber. Akad. Wiss. Wien, math.-nat. Kl. 102 (pt. 1) : 236 (Swatow)

?*Sciaena meggan* Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10 : 222 (type locality: Mari Meridiano; Peking).

?*Sciaena chuan-chua* Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10 : 222 (type locality: Guli of Pechihli).

Collichthys chinensis Steindachner, 1866, Verh. zool. bot. Ges. Wien 16 : 475 (type locality: Hong Kong).

Collichthys fragilis Jordan & Seale, 1905, Proc. U. S. Nat. Mus. 29 : 522, fig. 4 (type locality: Shanghai); Jordan & Starks, 1906, Proc. U. S. Nat. Mus. 31 : 518 (Port Arthur, Manchuria), Jordan & Metz, 1913, Mem. Carnegie Mus. 6 (1) : 39, fig. 31, (copied) (Chinnampo and Port Arthur); Sowerby, 1930, The Naturalist in Manchuria 4 : 190 (compiled); Reeves, 1933, Man. Vert. Animals p. 424 (copied); Mori & Uchida, 1934, Jour. Chosen Nat. Hist. Soc. No. 19 p. 14 (Korea).

D. VII-IX/1/24-30, usually 26-28; A. II/11-13; V. 1/5. L. l. with about 50 tubular scales to base of caudal; l. tr. 6-7/7-8. 30 or 31 predorsal scales; lower base of soft vertical fins covered by small scales. Depth in length 3.6-4; head 2.5-3.2. Eye in head 3.2 in young to 7 with age; thickness of head 2; snout 3.7 to 4; interorbital 2.7-3; maxillary 1.2 to 1.0; depth of peduncle 3.7-4; its length 1.3-1.5. Depth of peduncle in its length 2.7-3.

Oblong, compressed; head very large; peduncle slender. Bones of head loose. Whole body, except jaws, chin, isthmus, paired fins and extreme portion of vertical fins covered by scales. Mouth strongly oblique with the lower jaw slightly projecting beyond the upper jaw. Symphysis of upper jaw provided with a shallow emargination to receive the low and blunt symphysial knob of the mandible. Teeth small, in more or less villiform bands in jaws, no enlarged row; vomer and palate edentate. Lips very thin, finely pimpled along edge. No distinct pores at chin. Eyes small. Interorbital wide, very high and convex, nostrils double, close to eye; ridge of vertex covered by scales at base, with 4-5 short spines. The ridge and spines become rudimentary or disappear in mature fish, but very prominent in young specimens. Internmaxillary protractile downward. Preopercular margin spiniferous; tip of the spines scarcely extending beyond membrane. Operculum terminating in a weak, flexible point. Branchiostegals 7. Gillrakers 10+17-20, no rudiments, longest longer than gill-filaments or equal to eye diameter. Pseudobranchiae present, not so well developed as in other Sciaenids.

Origin of dorsal opposite to that of pectorals. Dorsal spines weak; first spine minute, 3rd spine longest, not longer than the longest soft ray. A deep notch between spinous and soft dorsal. Anal origin opposite to 15th dorsal ray, or under middle of soft dorsal base. First anal spine small, second spine weak, about one-third of the first ray only. Base of anal long, terminating under one or two rays before soft dorsal axilla. Pectorals long, but slightly shorter than head. Ventrals thoracic, opposite to base of pectorals. Caudal lanceolate. Scales small, all cycloid, very deciduous.

ous, with 3-12 basal radii; circuli moderate, even; no apical denticles. About lower third of the height of soft dorsal and anal covered by small scales. Silvery or golden dermal glandular organs on side of body below lateral line, one below each scale. Intestine short, stomach long, pyloric caeca long, 14 in number. Air-bladder slender, extending the whole length of abdominal cavity, with about 20 pairs of arborescent appendages. Mouth cavity and peritoneum silvery. Vertebrae 28.

Orange-yellowish with whitish-silvery reflections. Dorsal and caudal dusky with condensed black specks terminally, other fins whitish.

I examined 12 specimens 69-115 mm. in length to base of caudal collected from Canton, numerous specimens 45-120 mm. from Chusan and Shanghai, 6 specimens 130-169 mm. from Haimen (海門) and one specimen 124 mm. from Foochow. As shown in Table 1, all the specimens from various parts of China are practically alike except that the eye becomes larger toward the south and the number of soft dorsal and anal rays increases toward the north. The Cantonese specimens agree better with Richardson's species, *Sciaena lucida*, and the Chusan fish with Jordan & Scale's species, *Collichthys*

TABLE 1

Descriptions of Collichthys lucida from various parts of China to show the similarity and variation in some essential characters

	CHUSAN	HAIMEN	FOOCHOW	CANTON
Number of specimens examined	55	8	1	12
Total length in mm.	45-120	130-169	124	69-115
Depth in length	3.0-3.8	3.3	3.2	3.2-3.4
Head in length	3.0-3.9	3.3	3.3	3.2-3.4
Eye in head	5.4-7.0	6.3	5.5	4.2-5.0
Gillrakers	9-10+17-20	10+18	10+18	10+18
Dorsal	VII-IX/1/25-30	VIII/1/25-28	VIII/1/25	VIII/1/24-26
Anal	II/12-13	II/11-12	II/12	II/11-12
Occipital ridge	With 3-5 spines	Ridge and spines all obsolete, operculum smooth	Spines obsolete	Ridge prominent with 5 spines

fragilis. Based on the differences of eyes and dorsal rays between the fish from Kwangtung and Fukien and those from North Chekiang and Kiangsu we should recognize at least two geographical races on the Chinese coast *Collichthys fragilis* Jordan & Seale, with Shanghai as its type locality and widely distributed in Korea, Manchuria, Shantung, Kiangsu and northern Chekiang, represents the northern race, while *Sciaena lucida* Richardson, inhabiting the coastal waters of southern Chekiang, Fukien and Kwangtung, represents the southern race. It is possible that *Collichthys fragilis* and *Sciaena lucida* are two valid species but in view of the similarities and intermediate variations in all the specimens examined we should admit only one species here.

Otolithes Oken

Otolithes Oken, 1782, Isis p. 1817. (Type: *Johnius ruber* Bloch, virtual monotypic.) (Based on Cuvier.)

Otolithus Cuvier, 1829, Regne Animal. ed. 2,2:172. (Type: *Johnius ruber* Bloch, designated by Gill, 1861, Proc. Acad. Nat. Sci. Phila. p. 80.)

Oblong to elongate, moderately compressed. Head pointed, snout depressed. Mouth oblique with both jaws equal in front or the lower slightly longer. Eyes on anterior half of head. Two approximate nostrils, the posterior oval, close to eyes. Maxillary distally only partly concealed and expanded under suborbital. No barbels, symphysial pores present or absent; snout with three small pores or no pores. Premaxillary teeth with an inner villiform series; the outer series conical, close-set and becoming enlarged anteriorly, with one or two strong, curved canines on each side; in lower jaw a strong curved canine on each side, behind it a series of distant unequal conical teeth, inside of them a few small ones; none on vomer, palate and tongue. Lips thin, smooth with finely fringed margin. Preopercular angle rounded, with small spines, the limb feebly denticulate. Operculum terminating in two flat points, the lower longer. Gillrakers short, few in number, extreme ones rudimentary. Pseudobranchiae. Branchiostegals 7. One dorsal, the spinous portion with a deep notch, consisting of IX to X slender spines. Anal with two spines and 7 to 12 rays. Both soft dorsal and anal entirely devoid of scales. Caudal cuncate. Scales of moderate or small size, ciliate or cycloid all over; lateral line slightly arched anteriorly, continued on caudal, sensory tube bifid or arborescent.

Warmer Indian and Western Pacific fishes, but not entering Oceania.

Otolithes argenteus Cuvier

Otolithus argenteus: (Kuhl & van Hasselt) Cuvier, 1830, Hist. Nat. Poiss. 6:62 (type locality: Batavia, Malabar, Malacca); Richardson, 1846, Ichth. China, Japan p. 225 (Canton); Cantor, 1849, Jour. Asia. Soc. Beng. 18 (pt. 2):1943 (1850) (Sea and estuaries of Penang, Malayan Peninsula, 1861, Proc. Zool. Soc., London p. 222 ("Nepal"); Day, 1865, The Fishes of Singapore); Gunther, 1860, Cat. Fish. Brit. Mus. 2:310 (China: Ceylon); Malabar p. 58 (Malabar); Kner, 1865, Reise Novara, Fische p. 135, pl. 6,

fig. 4 (air-bladder) (Java); Bleeker, 1865, Nederl. Tijdschr. Dierk. Amsterdam 2:56 (Amoy); Playfair, 1866, The Fishes of Zanzibar p. 53 (Aden, mouth of Pangani River, East Africa); 1868, Proc. Zool. Soc., London p. 10 (Madagascar); Bleeker, 1874, Verh. Akad. Amsterdam 14 (4):9 (Sumatra, Nias, Penang, Singapore, Banks, Java, Madura, Borneo, Celebes); Martens, 1876, Preussische Exped. Oest-Asien p. 390 (Yeddo; Bangkok); Day, 1876, The Fishes of India pt. 2, p. 197, pl. 45, fig. 3; Bleeker, 1877, Atlas Ichth. Vol. 9, pl. (2) 185, fig. 5; Jordan & Eigenmann, 1886 [1889], Rept. U. S. Fish. Comm. pt. 14, p. 346 (Hong Kong); Day, 1889, Faun. Brit. India, Fishes 2:129; Elera, 1895, Cat. Fauna Filip. p. 503 (Luzon; Cavite); Duncker, 1903 (1904), Mitteil. Naturh. Mus. Hamburg 21:154 (Jeram; Kuala Lumpur); Fowler, 1904, Proc. Acad. Nat. Sci. Phila. ser. 2, 12:530 (Padang); Pellegrin, 1905, Bull. Soc. Zool. France 30:84 (Baie d'Along, Tongking); Evermann & Seale, 1906, Bull. Bur. Fish., Washington 26:87 (1907) (Bacon); Pearson, 1912-1913, Ceylon Administr. Rept. p. E11; Zugmayer, 1913, Abh. Akad. Wiss., math. phys. Kl. 26:12 (Mekran); Pearson, 1915 1918, Ceylon Administr. Rept. p. F13; Ogilby, 1918, Mem. Queensland Mus. 6:63, pl. 20 (Edgecumbe Bay).

Otolithes argenteus Jordan & Starks, 1917, Ann. Carnegie Mus. 11(3 & 4): 452 (Ceylon); Fowler, 1929[1930], Proc. Acad. Nat. Sci. Phila. p. 650 (Padang); 1931, p. 446 (Singapore); 1933, U. S. Nat. Mus. Bull. 100 12:355 (Samar, Bacon; Java; Padang; Singapore); Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):5, fig. 2 (Kwangtung); Tang, 1937, Amoy Mar. Biol. Bull. 2(2):49 (Amoy).

Otolithus orientalis Seale, 1910 [1911], Phil. Jour. Sci. 5:281, pl. 4 (type locality: Sandakan, Borneo).

D. X/1/28-29; A. 11/7; V. 1/5. L. l. with 50-54 tubular scales l. tr. 8/14. Depth in length 4.2-4.6; head 3.2-3.6. Eye in head 5.2-6.5. snout 3.8-4; interorbital 4.5; maxillary 2.3; third dorsal spine 2; second anal spine 9; peduncle length 1.1; its depth 3.8. Depth of peduncle in its length 3.

Rather elongate, moderately compressed. Snout bluntly pointed. Mouth oblique, with the lower jaw slightly longer; maxillary extending to the vertical from middle of orbit or slightly beyond. Lips of moderate thickness, finely finged at margin. Two strong, curved inward canines at front end of upper jaw, widely set and sometimes with smaller one behind each. Lower jaw with one single strong canine at symphysis; small, conical and pungent teeth on sides of both jaws, arranged in one series. Neither pores nor barbels on chin. Preopercular angle rounded, with small spines; limb feebly denticulate. Operculum terminating in two flat points, the lower longer. Gillopenings wide; gillrakers short, 4+9-10 on anterior arch, extreme ones rudimentary, longest 2.5 in eye diameter. Pseudobranchiae present. Branchiostegals 7. Two dorsals continuous, not covered by scales; spinous dorsal commencing above root of pectorals. Soft dorsal transparent, its rays lower than the longest spine. Anal commences behind middle of soft dorsal, opposite to 17th ray. First anal spine minute, second spine small, about 1/3 or less the anal ray. Pectorals shorter than head, reaching tip of ventrals. Ventrals thoracic. Caudal cuneate. No scales on dorsal and anal. Scales cycloid, usually wider than long, with 14-18 basal divergent radii; no apical denticles. Sensory tubes on

scales of lateral line branched. Intestine short, with 4 pyloric caeca; stomach long and large. Air bladder simple, thick-walled, extending whole length of abdominal cavity, provided with 40 pairs of appendages. Peritoneum white. Vertebrae 24.

Coloration uniform in formalin. Mouth colorless.

Two specimens 170 to 210 mm. to base of caudal, collected from Swabue, Kwangtung Province.

(*To be continued.*)

**NEW LONGICORN BEETLES FROM CHINA, V
(COLEOPTERA: CERAMBYCIDAE)**

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This installment of the series concerns part of a collection of longicorns from Szechwan Province in western China, sent to the United States National Museum by the Rev. David C. Graham, of Chengtu, Szechwan. The specimens were kindly sent me by Mr. W. S. Fisher, of the United States Bureau of Entomology, through the National Museum. I wish to express my very deep appreciation to Mr. Fisher, as well as to the Reverend Graham. The type specimens are deposited in the United States National Museum in Washington, D. C., and duplicates are in my own collection.

Subfamily **Lepturinae**

Tribe **Lepturini**

Apatophysis kashmiriana Semenov ? (pl. 4, fig. 7)

Apatophysis kashmiriana Semenov, Rev. Russe d'Ent. 1: 29, 1901; Gahan, Faun. Brit. India, Col 1. 70, fig. 26, 1906 (Kashmir, Tibet).

A single male specimen in the U.S. Nat. Mus. was taken by the Rev. D. C. Graham at Mowchow, alt. 5,000 ft., Szechwan Prov., W. China, Oct. 1924.

Reddish-brown, clothed with thin, silky, pale buff pubescence; eyes black. Antennae nearly one-half again as long as body; prothorax not very sharply tuberculate laterally; elytra finely and irregularly punctured on basal three-fourths.

Pachyta ? sp. (pl. 4, fig. 8)

Several specimens (U. S. Nat. Mus. and Gressitt collection) were taken at Mt. Omei and vicinity, alt. 4,000–10,000 ft., Szechwan Prov., W. China, in 1922 and Aug. 1925, by D. C. Graham.

Leptura fisheriana n. sp. (pl. 4, fig. 3)

Female.—Black, fairly shining, elytra with four series of ochraceous markings: (1) an oblique, subsinuous line from base, near humerus, to near suture, (2) a pair of spots on each, near end of first third, outer one transverse, closely approaching external margin, inner one larger, oblique, (3) a transverse band just behind middle, constricted in middle, more closely approaching external margin than suture, and (4) a slightly wider transverse bar a short distance before apex, not quite touching margin and suture; legs reddish-chestnut on femora and tibiae (except extreme apices) and on tarsal claws; eyes reddish-brown. Head and prothorax clothed

with moderately long, erect, brown hairs; antennae hardly ciliated; elytra clothed with short, oblique, dull golden-brown hairs; ventral surface and legs with longer, sparse, oblique, yellowish-white hairs.

Head densely and finely punctured, medially grooved on frons and carinate on occiput; vertex feebly concave; neck strongly constricted a little behind eyes; eyes strongly constricted. Antennae two-thirds as long as body; scape gradually thickened, three-fourths as long as third segment; fourth shorter than fifth and longer than sixth; fifth subequal to third. Prothorax strongly constricted anteriorly, moderately dilated at basal angles, transversely grooved at base; surface densely punctured except along mid-line from center to near base. Elytra finely and evenly punctured, submarginate-truncate apically. First hind tarsal segment fully as long as remaining united. Length 12–13 mm.; breadth 4–4.6 mm.

Holotype, female (No. 52276 U. S. Nat. Mus.), southwest of Tatsienlu, alt. 9,000–13,000 ft., Szechwan Prov., W. China, June 28–July 2, 1923; paratype, female (Gressitt collection), Ngan Yang, west of Chetu Pass, alt. 13,000–14,500 ft., near Tatsienlu, Szechwan; additional paratype in U. S. Nat. Mus.; all collected by the Rev. D. C. Graham.

Differs from *L. kingana* Pic in having the legs largely red, the abdomen entirely black, the antennae more slender, etc.

Leptura grahamiana n. sp. (pl. 4, fig. 4)

Female.—Body black, somewhat shining beneath; elytra shining, pale ochraceous, banded with black as follows: (1) extreme base and top of humerus narrowly black, (2) an irregular, subtransverse black band near end of basal quarter, extending anteriorly behind humerus, (3) a slightly oblique band at about middle, (4) a slightly wider, feebly arched band in beginning of apical quarter, (5) apical ninth, or so, entirely black, and (6) external margin extremely narrowly, and suture less narrowly, black; eyes reddish; apical borders of abdominal segments brownish. Head and prothorax with moderately long, fine brown hairs; antennae with very short black bristles; elytra with short oblique hairs corresponding in color to ground-pattern; ventral surface with sparse subrecumbent or suberect somewhat golden hairs.

Head abbreviated anteriorly, densely and irregularly punctulate; frons short, depressed apically, grooved medially; vertex feebly concave, grooved medially; eyes deeply constricted, inferior lobe subtriangular. Antennae two-thirds as long as body; scape three-fourths as long as third segment; fifth longer than third; third longer than fourth and subequal to sixth. Prothorax broader than long, strongly constricted apically and expanded basally, sides slightly produced anterior to middle; surface finely rugulose-

punctate, concave along mid-line and on either side of disk. Scutellum narrow, triangular. Elytra minutely punctulate, emarginate-truncate apically. First hind tarsal segment practically as long as following segments combined. Length 11–16 mm.; breadth 4.5–6 mm.

Holotype, female (No. 52277 U. S. Nat. Mus.), Washan, alt. 11,000 ft., Szechwan Prov., W. China, July 26, 1925; paratype, female (Gressitt collection), near Songpan, alt. 12,000–13,000 ft., Yellow Dragon Gorge, Szechwan Prov., July 25–26, 1924; paratype, male (Gressitt collection), near Tatsienlu, alt. 10,000–12,000 ft., Szechwan Prov., Aug. 2–4, 1923; and a paratype in U. S. Nat. Mus., all taken by the Rev. D. C. Graham.

Differs from *L. ochraceofasciata* Motschulsky (*Strangalia*), of Japan, in having the body entirely black except for the elytra, and in having the prothorax much shorter and less pubescent, the elytra broader, the legs shorter, etc.

Trib^e *Eroschemini*

***Pyrocalymma conspicua* Gahan (pl. 4, fig. 10)**

Pyrocalymma conspicua Gahan, Faun. Brit. India, Col. 1:89, 1906 (Ruby Mines, Burma).

A single specimen (U. S. Nat. Mus.), probably a male, was taken by the Rev. D. C. Graham near Muping, alt. 13,000–14,000 ft., Szechwan Prov., W. China, July 7, 1929.

The antennae reach well behind the middle of the body, the third to fifth segments only are very widely expanded and tufted on both sides apically, the seventh and following are nearly cylindrical.

Subfamily *Cerambycinae*

Trib^e *Clytini*

***Cyrtoclytus ventripennis* (Pic) (pl. 4, fig. 9)**

Clytus ventripennis Pic, L'Échange 24: 61, 1908 (Yunnan).

A single specimen in the U. S. Nat. Mus. was taken by the Rev. D. C. Graham at Sⁱ in-kai-si, alt. 4,400 ft., Mt. Omei, Szechwan Prov., W. China.

***Chlorophorus moupinensis* (Fairmaire)**

Clytus Moupinensis Fairmaire, Ann. Soc. Ent. Belg. 32:33, 1888 (Moupin, Szechwan).

Three specimens (U. S. Nat. Mus. and Gressitt collection), were collected in Szechwan Prov., W. China, by the Rev. D. C. Graham: one at Kuanhsien, alt. 1,800–3,500 ft., July–Aug. 1924, one at Tsit-teng-tung, alt. 4,000 ft., Washan, July 19, 1925, and one at Kiating, alt. 1,300–4,000 ft., Aug. 12, 1929.

The median transverse elytral band may be nearly complete and extend forward a short distance along suture, or may be reduced to two spots.

***Chlorophorus notabilis semiobliteratus* (Pic) (pl. 4, fig. 1)**

Clyanthus notabilis var. *semiobliteratus* Pic, Mat. Longic. 4 (1) : 31, 1902 (China).

Chlorophorus notabilis var. *obliteratus*, Aurivillius, Col. Cat. 39 : 398, 1912.

Brownish-black, densely clothed with pale olive pubescence above and pale sulphur yellow beneath; each elytron marked with a parenthesis-shaped subbasal spot near suture, a narrow longitudinal stripe from humerus to beyond middle, followed by a narrow spot, an irregular triangular spot just interior to the last, and three small, narrow spots in a triangle just before middle of disk; abdominal segments narrowly margined with dark brown at apices and bases; eyes reddish-brown.

Antennae slender, about three-fourths as long as body; pronotum with a pair of feebly raised parenthesis-shaped areas; elytra obliquely emarginate-truncate apically; legs slender; first hind tarsal segment a little longer than remaining combined. Length 14.5 mm. (to apices of elytra); breadth 3.4 mm.

A single specimen was taken near Kiating, alt. 4,400 ft., Shin-kai-si, Mt. Omei, Szechwan Prov., W. China, in 1921, by the Rev. D. C. Graham.

This subspecies differs from typical Japanese *notabilis* in having the body, as well as the antennae and legs, more slender, the prothorax immaculate and the elytra with smaller spots.

Subfamily **Lamiinae**

Tribe **Dorcadiionini**

Echthistatodes new genus

Head broad, about as wide as elytra at base; vertex concave, moderately broad; eyes with inferior lobes narrow and vertical; antennae barely longer than body in female; scape slender, slightly thickened apically; prothorax as broad at apex and base as elytral base, sharply spined before middle of each side and with a raised swelling on either side of disk before middle; scutellum short; elytra connate, arched, declivitous and separately rounded posteriorly, vertically truncate at sides, with a prominent tuberculate carina at top of each side; metasternum very short; first abdominal segment as long as following two united; first hind tarsal segment nearly as long as two succeeding combined; femora slender, hind pair not reaching elytral apices.

Genotype.—*Echthistatodes brunneus* n. sp.

Range.—Western China.

This genus differs from *Echthistatus* Pascoe in having the head no wider than apex of prothorax, the apex and base of prothorax as wide as base of elytra, the elytra longer, rounded apically, vertical laterally and lacking large nodes on either side of base, the tarsi more slender, etc.

***Echthistatodes brunneus* n. sp. (pl. 4, fig. 16)**

Female.—Dark reddish-brown, head, antennae and legs dark chocolate brown, nearly black. Body practically glabrous above; ventral surface and legs sparsely clothed with brown hairs.

Head narrower than prothorax, wider than deep, largely rugose, particularly between upper lobes of eyes; frons fairly even, broader than deep; antennal insertions moderately prominent, fairly distant; vertex angulately concave between former; eyes narrow, of nearly equal width throughout, inferior lobe about twice as high as wide. Antennae barely longer than body, attenuated apically; scape slightly thickened apically, wrinkled, two-thirds as long as third segment, subequal to fourth; fifth one-half as long as third; following shorter. Prothorax transverse, coarsely rugose, a raised swelling on either side of mid-line before center and a sharp tubercle before middle of each side. Scutellum small, rounded-triangular. Elytra vertical laterally below a prominent, slightly overhanging tuberculate ridge extending to apical fifth, broadest behind middle, separately rounded apically, sparsely tuberculate on basal portion as well as on dorso-lateral ridges. Ventral surface sparsely punctate. Legs slender; femora nearly parallel; tarsi slender, first segment of hind pair as long as following two united. Length 22 mm.; breadth 8 mm.

Holotype, female (No. 52278 U. S. Nat. Mus.), Shin-kai-si, alt. 4,400 ft., Mt. Omei, Szechwan Prov., W. China, Aug. 1921, D. C. Graham.

Differs from *Echthistatus binodosus* Waterhouse, of Japan, in having the prothorax and elytra broader, the elytra wider posteriorly, rounded apically and lacking basal nodes on either side of scutellum, the sides higher, the disk flatter, etc.

Tribe **Monochamini**

***Psacothaea rubra* n. sp. (pl. 4, fig. 12)**

Reddish-brown, marked with areas of white pubescence as follows: prothorax with a narrow longitudinal white stripe on each side from just above lateral tubercles to base, scutellum largely clothed, each elytron with about ten small spots, irregularly arranged in three or

four fasciae between basal fifth and apical tenth; antennae with basal two-thirds of third and fourth segments, basal halves of fifth and ninth segments and larger part of last two segments clothed with white, remainder largely clothed with short, sparse, tan or whitish hairs; tarsi more thickly clothed with white above; clypeus testaceous.

Head moderately short, irregularly punctured, becoming fairly prominent at antennal tubercles, between which the vertex is obtusely concave; frons squarish, broader than high; genae prominent; eyes deeply emarginate, inferior lobes deeper than wide. Antennae three-fourths again as long as body; scape subpyriform, truncate apically; its cicatrix large and feebly margined; third segment nearly twice as long as scape, one-third again as long as fourth; fifth to tenth gradually shorter. Prothorax broader than long, armed at each side with a strong, slightly recurved sharp tubercle, constricted near base and apex, and swollen in a longitudinal direction along middle of disk; surface coarsely vermiculose above. Scutellum short, rounded. Elytra relatively short, slightly narrowed, briefly emarginate-truncate apically, asperate-punctate basally, nearly impunctate beyond middle. First hind tarsal segment shorter than following two united. Length 14.5 mm.; breadth 5 mm.

Holotype, male (?) (No. 52279 U. S. Nat. Mus.), Chengtu, alt. 1,700 ft., Szechwan Prov., W. China, July 3, 1933, D. C. Graham.

Differs from *Ps. hilaris* Pascoe in being smaller and reddish-brown instead of grayish-black, in having the antennae shorter and more annulated, the prothorax very strongly toothed laterally, the elytra much rougher basally, etc.

Dihammus sp. (pl. 4, fig. 18)

A single male specimen (U. S. Nat. Mus.) was taken at Suifu, Szechwan Prov., W. China, in 1922, by D. C. Graham.

Coscinesthes porosa Bates (pl. 4, fig. 17)

Coscinesthes porosa Bates, Entomologist 23 : 247, 1890 (Washan, alt. 6,000 ft.).

Black, thinly clothed with reddish-brown pubescence; third to eleventh antennal segments gray basally for proportionately greater lengths posteriorly; head strongly punctured; prothorax coarsely granulose; elytra very coarsely foveate-punctate, the foveae black and shining; ventral surface finely and irregularly spotted with black. Length 21.5 mm.; breadth 7.2 mm.

A single specimen (U. S. Nat. Mus.) was taken between Fu-lin and Yueh-shi, alt. 4,000-8,000 ft., Szechwan Prov., W. China, July 20-21, 1923, by Rev. D. C. Graham.

Tribe **Mesosini****Mutatocoptops** sp. (pl. 4, fig. 14)

A single specimen (U. S. Nat. Mus.) was taken at Chengtu, alt. 1,700 ft., Szechwan Prov., W. China, July 1-5, 1933, by Rev. D. C. Graham.

Tribe **Hecyrini****Moechotypa alboannulata** Pic (pl. 4, fig. 15)

Moechotypa alboannulata Pic, Mel. Exot. Ent. 63 : 13, 1934 (Szechwan).

A single female specimen (U. S. Nat. Mus.) was taken at Shin-kai-si, alt. 4,400 ft., Mt. Omei, Szechwan Prov., W. China, by D. C. Graham, in Aug. 1921.

Tribe **Niphonini****Pterolophia alternata** n. sp. (pl. 4, fig. 19)

Male.—Black, apical tarsal segments and palpi reddish; body clothed with black, brown, tawny or white pubescence as follows: head with dull tawny, marked with pale buff, pubescence; antennae blackish-brown, scape partly tawny, basal two-fifths of third segment, basal two-thirds of fourth, basal halves of sixth, eighth and tenth, extreme bases of seventh and ninth, and apex of last, white internally and pale buff externally; prothorax dull brown varied with tawny; elytra largely clothed with thin, dull, tawny-brown pubescence, dotted with white hairs, indistinctly banded with tawny-white behind middle and spotted with black on basal tubercles, ends of dorsal carinae, suture, etc.; ventral surface irregularly clothed with pale hairs, posterior margins of abdominal segments with dense fringes of buff hairs; legs blackish, sparsely and irregularly clothed with pale hairs. Antennae with an internal fringe of fine hairs; elytral carinae moderately tufted.

Head moderately narrow, distinctly concave at vertex, deeply punctured on occiput; inferior lobes of eyes obliquely oval. Antennae five-sixths as long as body; scape four-fifths as long as third segment; fourth subequal to scape, one-half again as long as fifth. Prothorax barely broader than long, hardly swollen at sides, narrower at apex than at base, slightly swollen and medially grooved on disk. Scutellum short. Elytra slightly broadened to beyond middle, subacute apically, each with a strong, compressed tubercle near base, a distinct dorsal carina and a long, suboblique, median carina; surface grossly punctured basally. Metasternum very short. Femora feebly swollen. Length 9.3 mm.; breadth 3.3 mm.

Holotype, male (No. 52280 U. S. Nat. Mus.), Suifu, Szechwan Prov., W. China, 1922, D. C. Graham, collector.

Differs from *P. zonata* Bates, of Japan, in being wider, with the antennae thicker, the prothorax broader, the scutellum much shorter, the elytra more strongly tuberculate and carinate and less distinctly

light colored apically. Differs from *P. kiangsina* Gressitt in being more tuberculate and carinate; less distinctly banded and with the antennae annulated with pale.

Pterolophia serrata n. sp. (pl. 4, fig. 13)

Female.—Reddish-brown to darker brown, densely clothed with brown, tawny, buff, black and white pubescence as follows: head clothed with rusty brown varied with buff and blackish-brown, a pair of narrow oblique lines on the former near lower end of frons; antennae partly rusty brown, scape spotted with dark brown, third and fourth segments with basal three-fourths whitish internally and tawny externally, following segments with a ring of white hairs at base of each and a few scattered white hairs on reddish-brown; prothorax dull brown spotted with pale buff and blackish, principally along either side of middle of disk and on borders; scutellum blackish, edged at either side with light tawny; elytra largely dull brown on basal three-fifths and mainly light brown to pale buff on apical portion, the two areas separated by an oblique line, the anterior (dark) area being convex behind, basal portion with some buff areas, including a faint "V" behind basal tubercles, some black spots on extreme base, suture, external margin, tufts on dorsal carinae and apices; ventral surface largely pale buff, sides of hind thorax dull brown, abdomen spotted with brown, the last segment blackish-brown; legs rusty-brown varied with dark brown, hind pair largely buff, apical tarsal segments reddish-buff. Antennae with an internal fringe of blackish-brown hairs; raised areas of elytra with tufts of hairs forming serrations.

Head sparsely punctured, broad in front, rather concave between antennal insertions, which are raised and bear a tuft at top; inferior lobe of eye distinctly horizontal. Antennae three-fourths as long as body; scape slightly longer than third segment; fourth hardly as long as third and twice as long as fifth. Prothorax subcylindrical, hardly swollen at sides, broader than long, raised on either side of middle of disk and transversely depressed before apex. Scutellum short, rounded. Elytra considerably broader than prothorax, narrowed from humeri; apices subrounded, oblique internally; surface of each with a high, laterally compressed tubercle near base, a strong dorsal carina extending to beginning of apical declivity and two minor subapical carinae ending in small, tufted tubercles; surface coarsely punctured basally. Sides of metasternum deeply punctured. Length 11 mm.; breadth 4.6 mm.

Holotype, female (No. 52281 U. S. Nat. Mus.), Muping, alt. 5,000–6,000 ft., Szechwan Prov., W. China, July 17, 1929, D. C. Graham.

Differs from *P. binotata* Bates, of Formosa, in behind darker brown and more tufted, with the vertex more concave, the pronotum more swollen and the elytra more strongly raised basally, less

carinate along middle of sides, tuberculate preapically and less obtuse apically.

Tribe **Apodasyini**

Anaespogonius new genus

Antennae slightly longer than body; scape cylindrical, subequal in length to third segment; head broader than prothorax at base; frons strongly transverse, feebly convex; vertex broad and feebly concave between antennal insertions; eyes deeply emarginate, not very finely faceted; prothorax broader than long, briefly tuberculate near middle of each side, feebly constricted near base, punctured above; scutellum slightly narrowed and rounded apically; elytra about two and one-third times as long as broad, subparallel, rounded apically and densely punctured; anterior coxal cavities separate, closed behind, briefly angulate externally; middle coxal cavities open externally to epimera, separated by a moderately broad, plane, apically truncate process; metepisternum narrow and parallel; first abdominal segment about as long as following two united; legs short, hind femora hardly reaching beyond third abdominal segment, first hind segment nearly as long as following two united.

Genotype.—*Anaespogonius fulvus* n. sp.

Range.—West China.

This genus differs from *Eupogonius* Leconte in being much less hairy, with the eyes more approximate above, the scape longer in proportion to the third antennal segment, the elytra longer and less regularly punctured, the middle intercoxal process more parallel, etc., and from *Eupogonioides* Fisher in being less hairy, and in having the frons more transverse, the antennae more slender, the prothorax tuberculate, instead of swollen, laterally, etc.

Anaespogonius fulvus n. sp. (pl. 4, fig 5)

Male.—Reddish-brown, slightly darker brown on sides of hind thorax, legs and basal portion of antennae, subtestaceous on apical portion of abdomen; body almost entirely clothed with a thin layer of golden buff pubescence and moderately clothed with short suberect golden brown hairs.

Head finely and rather densely punctured; frons one-third broader than high, feebly convex; vertex broad and weakly concave; eyes with inferior lobes one-third deeper than wide, reaching three-fourths distance from antennal insertions to bases of mandibles. Antennae one-fourth longer than body, tapering; scape as long as third segment, fourth a little shorter than third. Prothorax nearly as long as broad, as broad at apex as at base, slightly constricted before and behind middle, briefly tuberculate at middle of each side; surface with close punctures of irregular size. Elytra slightly narrowed posteriorly, rounded apically; surfaces moderately closely

punctured, partly in irregular longitudinal rows. Sides of metathorax distinctly punctured. Femora swollen; first hind tarsal segment nearly as long as following two united. Length 9.2–11 mm.; breadth 3.5–4 mm.

Holotype, male (No. 52282 U. S. Nat. Mus.), near Muping, alt. 3,000–7,400 ft., Szechwan Prov., W. China, July 1–3, 1929, D. C. Graham; allototype, female (Gressitt collection), same data.

Differs from the following in having the eyes deeper, the scape relatively longer than the prothorax, more tuberculate, the elytra more densely punctured and the color lighter.

Anaespongius omeimontis n. sp. (pl. 4, fig. 11)

Dark chocolate brown; antennae, bases of tibiae and tarsal claws reddish-brown. Body thinly and irregularly clothed with dull golden-brown pubescence, forming indefinite markings on elytra, narrow buffy fringes on posterior borders of abdominal segments, widest on first segment; body bristles very short, curved, antennae with a brief and sparse internal fringe.

Head broader than prothorax, coarsely punctured; frons wider than high, emarginate laterally, feebly convex; vertex wide, barely concave between antennal insertions; eyes deeply emarginate, both superior and inferior lobes subcircular. Antennae one-half again as long as body, twelve-segmented (?); scape slightly shorter than third segment; fourth slightly longer than third; fifth about as long as scape. Prothorax nearly as long as broad, subcylindrical, slightly constricted prebasally; each side with a minute tooth just behind middle; surface irregularly punctured, somewhat coarsely so on basal half. Ventral surface impunctate; first abdominal segment as long as following two united. Legs fairly short; femora feebly swollen; first hind tarsal segment nearly as long as following two united. Length 10.2 mm.; breadth 3.7 mm.

Holotype, male (?) (No. 52283 U. S. Nat. Mus.), Shim-kai-si, alt. 4,500 ft., Mt. Omei, Szechuan Prov., W. China, Aug. 1929, D. C. Graham, collector.

Differs from the preceding in being darker brown and less pubescent and in having the prothorax more cylindrical and less strongly toothed, the elytra less regularly and closely punctured, the metasternum impunctate, the scape shorter, etc.

Tribe Estolini

Sydonia subglabrata n. sp. (pl. 4, fig. 6)

Male.—Ochraceous brown; head, prothorax, pro- and meso-sterna and legs reddish-castaneous; abdomen dark brown, extreme apices of elytra black. Body very thinly clothed above with sparse white pubescence, more densely so beneath; antennae with a fine fringe of hairs along underside; elytral apices with some dense dark brown short erect hairs.

Head as broad as prothorax, squarish in front, irregularly punctured; frons feebly convex, emarginate below and above; vertex deeply and roundly concave between the prominent antennal insertions; occiput feebly punctured; eyes small, moderately emarginate, inferior lobe suboviform, extending less than one-half distance between antennal insertions and bases of mandibles. Antennae (incomplete) probably about as long as body; scape moderately short, swollen, subfusiform; third segment somewhat thickened apically, one-fourth longer than scape; fourth slightly arched, thickened apically, four-fifths as long as third. Prothorax fully as broad as long, subcylindrical, as broad at base as at apex, slightly broadened behind middle and constricted before base; surface subrugulose-punctate; disk slightly raised on either side of middle. Scutellum broadly rounded. Elytra more than twice as long as head and prothorax combined, narrowed posteriorly, apices divaricate, subacute and slightly raised; surface uneven, a raised subcarinate area at base of each, near scutellum, and four sublongitudinal costae, the first (from outer margin) extending to apex, the others meeting and terminating near apex, the third commencing near humerus; punctures fairly deep and close. Metasternum sparsely punctured. Femora moderately swollen, hind pair not quite reaching last abdominal segment; tibiae short: tarsi fairly long. Length 10.3 mm.; breadth 3 mm.

Holotype, male (No. 52284 U. S. Nat. Mus.), Muping, alt. 6,000 ft., Szechwan Prov., W. China, July 19, 1929, D. C. Graham.

Differs from *S. divaricata* Bates, of Japan, in having the antennae thicker, the prothorax slightly more swollen, the elytra more heavily punctured, more distinctly costate and more raised basally, more attenuated and divaricated apically. Differs from *S. costata* Matsushita, of the Ryukyu Is., in having the scape longer, the prothorax shorter and smoother and the elytra more costate. Although agreeing generically with *divaricata* and *costata*, *subylabratata*, like these two, differs from the type, *apomecynoides* Thomson, in having the scape swollen instead of cylindrical.

華產天牛蟲之新種誌

(鞘翅目：天牛科) (五)

嘉理思著

嶺南大學自然博物採集所

(摘要)

本文描述十九種分隸十五屬，屬新種者有二，為新屬者亦有二，各類皆詳見於圖。上述各種乃採自四川省。

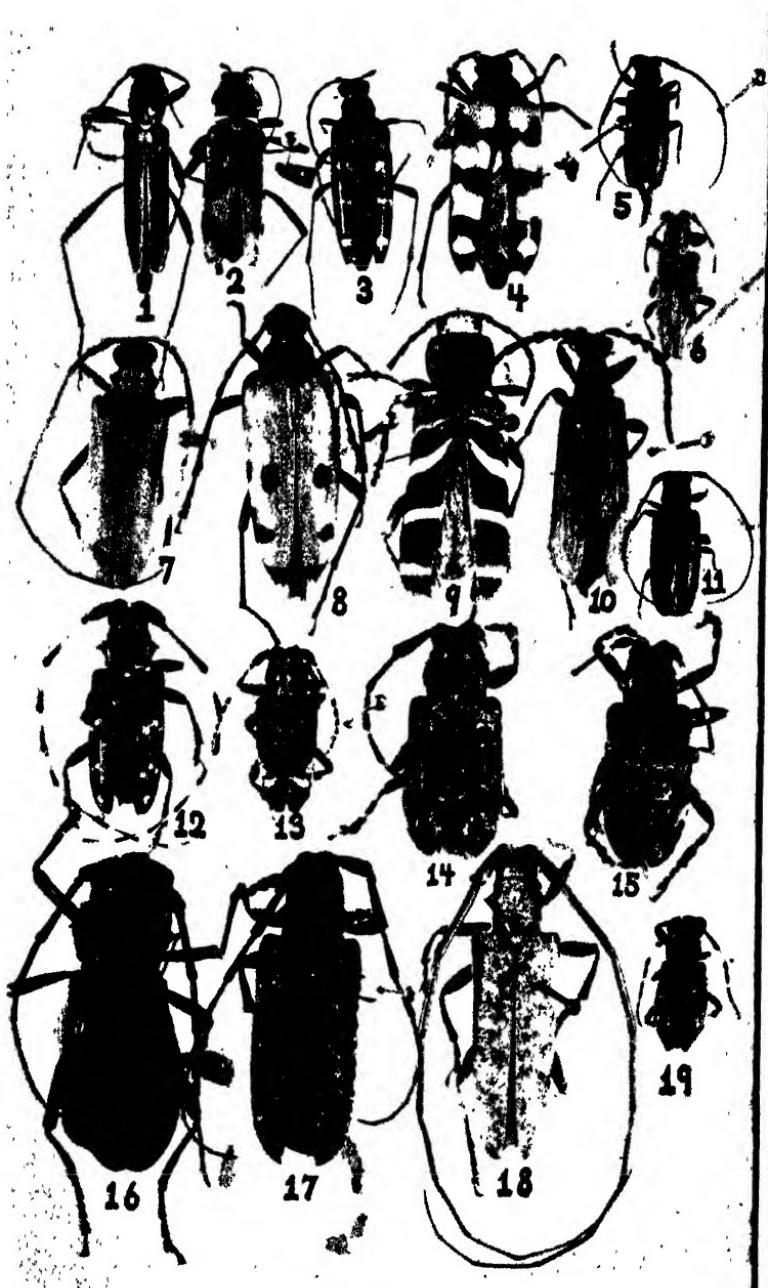
Explanation of Plate

- Fig. 1. *Chlorophorus notabilis semiobliteratus* (Pic)
 2. *Chlorophorus moupinensis* (Fairmaire)
 3. *Leptura fisheriana* n. sp.
 4. *Leptura grahamiana* n. sp.
 5. *Anaespagonius fulvus* n. sp.
 6. *Sydonia subglabrata* n. sp.
 7. *Apatophysis kashmiriana* Semenov
 8. *Pachyta* ? sp.
 9. *Cyrtoclytus ventripennis* (Pic)
 10. *Pyrocalymma conspicua* Gahan
 11. *Anaespagonius omeimontis* n. sp.
 12. *Psacothaea rubra* n. sp.
 13. *Pterolophia serrata* n. sp.
 14. *Mutatocoptops* sp.
 15. *Moechotypa alboannulata* Pic
 16. *Echthistatodes brunneus* n. sp.
 17. *Oscinesthes porosa* Bates
 18. *Dihammus* sp.
 19. *Pterolophia alternata* n. sp.

All new species are represented by the holotypes. Magnified 1.85 times.

Correction.

In number III of this series (Lingnan Sci. Jour. 16(3): 447-456, pl. 4, 1937), the magnifications in the explanation of the plate should read as follows: *Chinobrium mediofasciatum*, X 10; *Obrium rufograndum*, X 15; *Microdebilissa serratipenne*, X 25; *Prothema cariniscapa*, X 5; *Perissus rubricollis*, X 5; and *Agluophis albiventris*, X 5.



**BAMBUSA VENTRICOSA, A NEW SPECIES WITH A
TERATOLOGICAL BENT**

By F. A. McCLURE

*Curator of Economic Botany, Lingnan Natural History
Survey and Museum.*

***Bambusa ventricosa* sp. nov. (pl. 5)**

Frutex inermis, caespitosus, patens; culmis erectis vel suberectis, usque ad 2.5 m. altis et 1.2 cm. diametro (in ollis cultis); nodis glabris, vix prominentibus, internodiis glabris, cylindratis vel persaepius (abnormibus) lagenaeformibus vel pyriformibus; vaginis culni prompte decidui, glabris, apice late rotundatis aequilateris, auriculis orbiculatis vel obovatis vel interdum falcatis, obscure scabris, fragilibus; setis in ore multis, patentibus, tenuibus, pallidis, glabris vel basi plus minusve scabris, ligula 0.3–0.5 mm. longa, apice late rotundata, in margine undulata, minute denticulata, lamina vaginae erecta vel leviter reflexa, ovato-lanceolata, acuminata, basi subcordata, decidua; ramis glabris, inermibus; foliis 7–13, vagina glabra, auriculis prominentibus, fugescensibus, setis in ore multis, patentibus vel confertis, tenuissimis, pallidis, glabris vel basi plus minusve scabris, fugescensibus, ligula perbrevi, vix exserta, petiolo perbrevi, utrinque plus minusve hispidulo, lamina folii 12–21 cm. longa et 1.6–3.3 cm. lata, ovato-lanceolata vel oblongo-lanceolata, longe acuminata, basi abrupte rotundata vel subcordata vel subtruncata vel attenuata, utrinque subcencoloranti, supra glabra, subter pubescente, nervis secundariis utrinque 5–9, venulis transversis nullis. Inflorescentia ignota.

Affinis *B. multiplicis* sed vaginis culni haud glaucis, apice late rotundatis, aequilateris, lamina vaginae breviore (proportione vaginae), basi cordatis, auriculis grandioribus, lamina foliorum vix glaucis differt.

Shrubby bamboo, in caespitose clumps, compact at the base, spreading above; rhizome sympodial; culms entirely glabrous, more or less glaucous and deep green at first, becoming olivaceous yellow in age, the normal ones up to about 2.5 m. tall and 1.2 cm. in diameter (in pot culture), the fully dwarfed ones (with ventricose internodes) 25–50 cm. tall and up to 2.5 cm. in diameter, those in the intermediate condition up to 75 cm. tall and 1.5 cm. in diameter, more or less flexuous, the fully dwarfed culms usually strongly curved in one plane; nodes glabrous, not prominent; internodes elongate and cylindrical in the normal state, shorter and club-shaped in the intermediate state, pear-shaped in the typical, ventricose (dwarfed) state (see table of measurements for compara-

tive dimensions); *culm sheaths* entirely glabrous, deep green at first, sometimes obscurely tinted with brown and maroon, often becoming orange colored upon aging, pale stramineous and finely ribbed, the margins involute above, when dry; the apex broadly and symmetrically arched; the *auricles* well developed, orbicular or obovate to falcate, obscurely scabrous, olivaceous yellow to brown in color (dark stramineous when dry); the *oral setae* numerous, radiating, curved, slender, pale, smooth or only very sparsely and obscurely scabrous at the base; the *ligule* very short (0.3–0.5 mm. long, vertically), the apex arched, the margin pectinate or denticulate; *sheath blade* erect on lower sheaths, slightly reflexed on upper ones, deciduous, ovate-lanceolate, acuminate, the base more or less cordate, the inner surface antrorse-scabrous, the outer surface glabrous; *branches* unarmed, glabrous, spreading, the central one stout, more or less flexuose, up to 76 cm. long (at 8th node) in normal culms, up to 72 cm. (at 4th node) in culms with ventricose internodes, the shape of the inter-

TABLE 1

Measurements showing ratio of the diameter to length of the internodes in normal culms as compared with that prevailing in partially dwarfed and fully dwarfed culms

INTERNODE NUMBER	NORMAL CULM		PARTIALLY DWARFED CULM		FULLY DWARFED CULM	
	LENGTH OF INTERNODES	DIAMETER (CM.)	LENGTH OF INTERNODES	DIAMETER (CM.)	LENGTH OF INTERNODES	DIAMETER (CM.)
1	8.0	1.3	3.0	1.5	2.0	2.3
2	10.8	1.2	3.1	1.4	1.8	1.8
3	16.0	1.1	4.0	1.3	2.0	1.6
4	18.4	1.0	4.0	1.2	2.3	1.6
5	20.0	0.9	4.7	1.1	2.2	1.6
6	21.1	0.9	4.3	1.0	2.2	1.4
7	19.4	0.8	4.4	1.0	2.4	1.4
8	20.1	0.7	3.9	0.9	2.5	1.2
9	18.4	0.7	3.9	0.9	3.0	1.1
10	16.6	0.6	3.5	0.8	2.6	0.9
11	14.2	0.5	3.7	0.7	2.7	0.8
12	12.1	0.5	3.5	0.6	2.2	0.7
13	10.4	0.4	4.0	0.5	4.8	0.6
14	8.2	0.3	4.7	0.5	12.1	0.5
15	6.0	0.25	5.7	0.4		
16	3.7	0.2	5.7	0.3		
17	5.3	0.2	5.4	0.2		
18	2.5	0.2	3.4	0.2		
19	2.0	0.2	3.6	0.25		

Total length by direct

measurement : 237.9 cm.

78 cm.

46.3 cm

nodes of the branches reflecting more or less faithfully that of the internodes of the culm; *branch sheaths* promptly deciduous, intermediate in character between the culm sheaths and the leaf sheaths; *leaves* usually about 7 in number and small (up to 12 cm. long and 1.6 cm. broad) on twigs, as many as 13, larger (up to 21 cm. long and 3.3 cm. broad) and coarser on the tips of the main branches; *leaf sheath* entirely glabrous; the *auricles* more or less prominent, obscurely scabrous, fugacious; the *oral setae* spreading or crowded, pale, delicate, glabrous or nearly so, rather conspicuous at first, soon weathering away; the *ligule* very short, not exserted; *petiole* very short, greenish to olivaceous yellow or pale orange, more or less hispidulous on both surfaces; *leaf blade* ovate-lanceolate to oblong-lanceolate, long acuminate, the base abruptly rounded or subtruncate or subcordate (in basal leaves) to attenuate (in apical ones), the two surfaces subconcolorous, the upper entirely glabrous, the lower pubescent, scarcely or not at all glaucous; secondary veins 5 pairs in small leaves to 9 pairs in large ones; *inflorescence* unknown.

It will be noted that the measurements for the fully dwarfed culm stop at the 14th internode, while the figures for the other two continue only to the 19th internode. It is very difficult to secure a complete culm, owing to the activities of the common Shoot Beetle, *Cyrtotrachelus longimanus* F. (det. Prof. W. E. Hoffmann), which lays its eggs in the young shoots or immature culms, with the result that the part above the wound 'breaks off' or does not develop normally. However, the specimens are sufficiently representative for our purpose, namely, to show the relative proportions of the internodes in the different types of culm. The ratio of diameter to length of internode, based on the averages of the measurements of the five internodes (5-9) representing the zone including the longest internodes of each culm is 1:24.7 in the normal culm, 1:4.3 in the partially dwarfed culm, and 1:1.76 in the fully dwarfed culm. The results would be slightly different if the whole array of measurements for each culm were averaged, but these figures serve to contrast the proportions of the internodes in the three types.

A reversion of the internodes of the fully dwarfed culm toward normal proportions is seen to be taking place at the 13th node and upward.

Measurements were made of 48 culm sheaths from the six lower nodes of culms representing the three states, to determine the ratio of the length of the sheath blade to the length of the sheath proper. While the results of such a small array of measurements do not justify any sweeping conclusions, the averages indicate a ratio of about 1:2.1 in normal culms and about 1:4.5 in the dwarfed and partially dwarfed culms.

This species sends up its shoots over a very long period, extending from June to December.

The branching habit is typical of the unarmed species of *Bambusa*, with one central branch dominant in diameter and in length, two of secondary dominance, and a cluster of smaller ones radiating from the basal nodes of these. In general, the internodes of the primary branches tend to share the ventricose character of those of the culm from which they arise, in specimens where the dwarfing is pronounced, though there is, apparently, a slight lag in this respect.

Cited Specimens.—The description was drawn up and the measurements taken from living specimens originally secured from a commercial garden in Fati, Canton, and grown under pot culture in the Lingnan University Bamboo Garden (Accession No. 2651). Herbarium specimens under numbers *L. U.* 15138, *L. U.* 15143, and *McClure* 20667, TYPE, all prepared from these plants, have been accessioned and filed in the herbarium of the Lingnan Natural History Survey and Museum. *L.U.* 19653 (H. Fung) (specimens including culm with typical, abnormally shortened internodes) collected from a living plant 5 m. tall and 5.5 cm. in diameter, found growing on the campus of the Middle School at Chik-lung Market, Yang-chiang District, Kwangtung (東廣陽江, 織簷墟) probably belongs here, though it represents a much greater stature, presumably resulting from cultivation in rich soil in the open ground.

Distribution.—This plant is commonly found in pot culture in the gardens of southern China. There is a fine hedge of it growing in the open ground in the garden of the ancient monastery on the southern slope of Ts'ing Shaau (青山), over-looking Castle Peak Bay, on the Kowloon Peninsula, New Territories. The plants were in a flourishing condition, with brilliantly verdant foliage, in spite of the dry season. They were growing in partial shade, with their roots in rich, moist earth. The maximum height of the culms is about 2 meters, and the culms were found to be in the normal, the partially dwarfed, and the fully dwarfed states, respectively, in the usual ratio. They showed no evidence of any effort having been made to induce dwarfing artificially. It has been introduced into the United States, and is growing in Puerto Rico. Like all species of the genus *Bambusa*, it is limited by its temperature requirements to culture under tropical or subtropical conditions.

Vernacular Names.—The species is called 佛肚竹, in Cantonese Fat-t'o Chu, in Mandarin Fu-t'u Chu, in allusion to the resemblance of the bulging internodes to the rotund abdomen of the image of the Laughing Buddha. *L. U.* 19653 bears the name 佛竹, Cantonese Fat Chu. The English name, Buddha Bamboo, is proposed as a suitable adaptation of the Chinese.

Phyllostachys aurea, the so-called Japanese Golden Bamboo, is indigenous in southern China, and is also known here by the name Fat t'o Chu.

Economic Notes.—So far as our present information is concerned, this bamboo is grown only as an ornamental and a curiosity, and is not known outside of cultivation. It is claimed by some persons that the abnormally shortened internodes are produced artificially by the premature removal of the culm sheaths from the young sheaths, but this has not been necessary, in our experience. The abnormality appears quite spontaneously.

It should be made clear that, while the specific epithet chosen for this bamboo alludes to the swollen internodes of the dwarfed culms, the occurrence of this abnormality is not by any means its only distinctive character. In its normal state, the species lies near to *Bambusa multiplex* (Lour.) Raeusch. in habit, and in general appearance. However, the following vegetative characters readily distinguish *Bambusa ventricosa* from that species: Culm sheaths not at all glaucous, the apex broadly and symmetrically rounded, the sheath blade very much shorter in proportion to the sheath proper, and more broadly ovate in contour, with the base subcordate, the auricles of the culm sheaths much larger and the leaf blades not, or scarcely, glaucous on the lower surface.

From time to time bamboos have been described, among the culms of which a certain proportion develop abnormal internodes. *Phyllostachys heterocycla* Makino, known as *Lo-han Chu* (羅漢竹), *Chi-chieh Chu* (慈節竹) and Tortoise-shell Bamboo, is now understood to be an abnormal form, or freak, appearing at rather rare intervals among the normal plants of *Phyllostachys pubescens* Mazel apud Lehaie (*Ph. edulis* (Carr.) Lehaie). It is distinguished from the latter solely by abnormalities which appear in the lower portion of widely isolated individual culms. These abnormal culms are characterized by oblique nodes, alternating in such a manner as to form a zigzag pattern, and by greatly shortened internodes, with a roughly triangular shape when seen in longitudinal section. These abnormalities are usually confined to the lower portion of the culm, constituting a section 1-2 meters in length, the upper portion of the culm being normal in appearance. Occasionally a single internode of the abnormal type, bounded above and below by the typical, oblique nodes, is seen in culms of *Phyllostachys bambusoides* S. & Z., and in a Chinese species of *Dendrocalamus*, resulting in a knee-like deflection of the culm. *Phyllostachys aurea* (Carr.) Riv. produces a rather high percentage of culms with one to several abnormally shortened internodes, with nodes not, or usually only slightly, deviating from the horizontal. As in *Ph. pubescens*, this abnormality is confined to the lower portion of the culm. There is a strain of *Ph. aurea* in which a tendency toward an oblique orientation of the nodes in abnormal culms is typical. In the present species, the occurrence of the abnormally shortened internodes is also very often, though not so typically, confined to the lower portion of the culm.

While this dwarfed or partially dwarfed condition is not to be considered normal for the culms of this species, it certainly is typical, and it affords quite as useful and obvious a clue to identity for use in field determinations as the similar, and equally typical, abnormality in the culms of *Phyllostachys aurea*.

So far as the writer is aware, this is the first record of the occurrence of this type of abnormality in the culms of the sympodial type of bamboo. Communications from any reader of this paper who can supply further information on the subject will be heartily welcomed.

一種有畸形傾向之新竹 *Bambusa ventricosa*

莫古禮著

嶺南大學自然博物採集所實用植物標本室主任
(摘要)

本篇敘述竹之一新種，為植物界所未經述及者。此竹在華南稱為佛肚竹，多盆栽以供觀賞。此種竹有反常之竹稈，常雜生於正常竹稈之間。此異常之竹稈，稈短而節間腫脹，以其有腫脹之特徵，遂名為 *ventricosa*。在分類上，此竹有類於 *Bambusa multiplex* (Lour.) Raeusch.，惟其不同者則有下列數點：此新種竹之竹壳無粉，壳葉之尖端闊而均圓；壳葉與壳鞘之比率較為短；壳葉之輪廓呈闊卵形；竹之耳較大；葉片無粉，間或有之，惟其量則甚少。此壳節間呈腫大之現象，實為 *Bambusa* 屬中之僅見，亦為 sympodial 系中之新紀錄也。

在華南另有一種佛肚竹，已早經發表，而與本文所述者實同名而異物，請勿以其同名而混亂之。此另一種之佛肚竹，有野生及栽培者，其稈基部之節間，間亦呈短小腫脹之現象，其學名為 *Phyllostachys aurea* 而本文所述者則隸於 *Bambusa* 屬，兩者之普通名稱雖同，如考其特徵，則有顯著之差異焉。

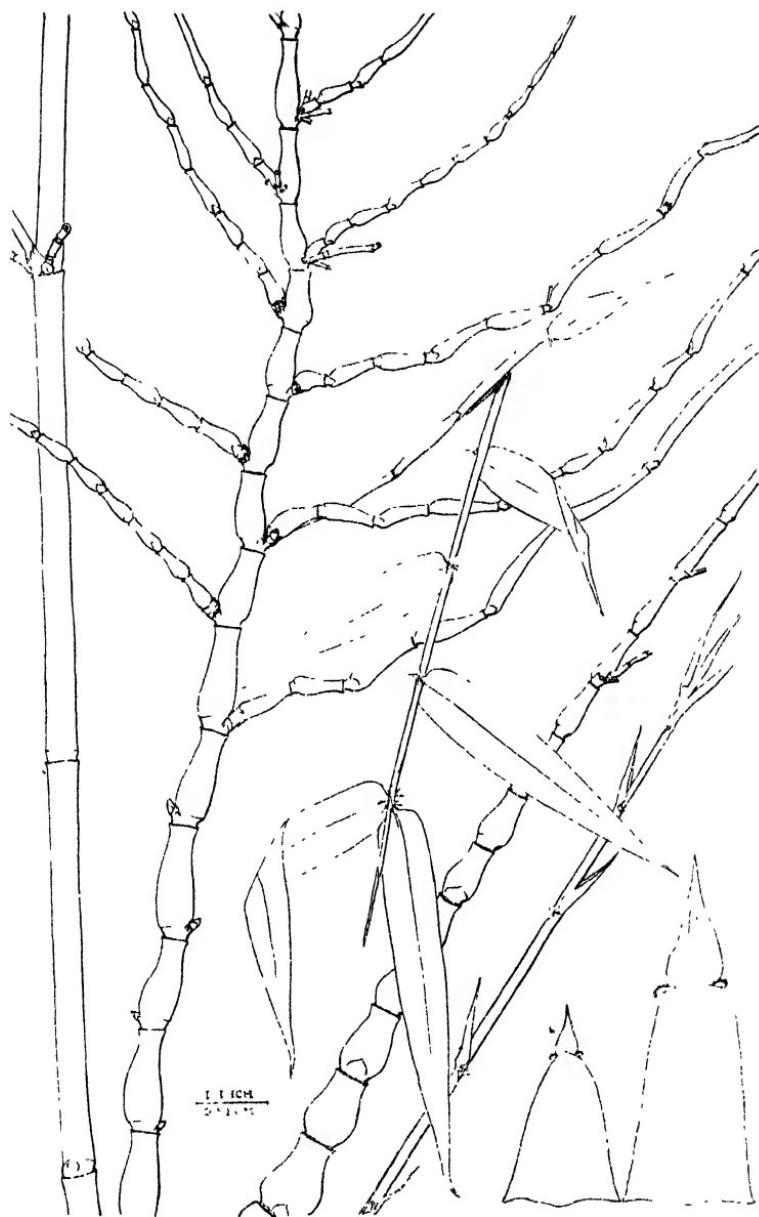


Fig. 1. *Bambusa ventricosa* sp. nov.

**NOTES ON MELALOPHA ANASTOMOSIS (L.) AND M.
ANACHORETA (F.) (LEP., NOTODONTIDAE)¹**

By Y. C. NG (NG YUK CHAU 吳玉洲)

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Melalopha anastomosis (Linnaeus) and *M. anachoreta* (Fabricius) are two common pests of *Xylosma congestum* (Lour.) Merr. on Lingnan University campus. During the winter of 1935, when they were studied, they were fairly abundant in number and the damage done to the leaves was quite noticeable.

***Melalopha anastomosis* (Linnaeus), 1758**

Melalopha anastomosis (L.) (*Pyguera anastomosis* (L.) or *Ichthyura anastomosis* (L.)) has been reported in China, Chosen, India, Ceylon, Java, Borneo, Japan, Siberia, Europe, and North America. According to Noyori (1929) (see *Rev. Appl. Ent.*, Ser. A, 17(10):565) the larvae feed on the leaves of *Populus* and *Salix*, in Japan, where there are about five generations per year. The specimens with which this paper deals were reared from caterpillars collected on the leaves of *Xylosma congestum* (Lour.) Merr. on Lingnan University campus from October 28, 1935, to April 29, 1936.

In Canton, the winter generation takes about four months to complete its development. The newly hatched caterpillars appeared November 27, 1935, pupated January 29, 1936, and the adults emerged February 20, 1936. On February 23, these adults deposited eggs which hatched on March 23. In short, it takes slightly more than two months to complete larval life; there are five instars. The duration of the first stadium varies from five to six days. The second stadium lasts about a week. The third stadium is from nine to ten days. The fourth stadium varies from ten to twelve days. The fifth stadium and the pupal stage each requires about three weeks. The duration of the incubation period is about a month. The pupae are found inside the fairly thin pale ochraceous cocoons. More than five hundred eggs are deposited by a female. The duration of the egg-laying period is from four to seven days. The adults can live as long as three weeks.

The Eggs

The egg is rounded in outline, the portion glued to the leaves is flat, and there is no conspicuous sculpture. The color varies from

¹ Contribution from the Lingnan Natural History Survey and Museum, Lingnan University, Canton, China.

The writer wishes to thank Prof. W. E. Hoffmann, Director of the Lingnan Natural History Survey and Museum, Lingnan University, for reading over the manuscript.

pale greenish to slightly grayish or pinkish. The diameter of the egg is 0.586—0.610 mm.; the measurements were made from material in 75% alcohol.

The Caterpillars

The First Instar.—The first instar caterpillars measured from 2.5 to 3.0 mm. long. The newly hatched caterpillars are dull smoky, later become pale grayish. The head is dark. Setae of both head and body are prominent.

The Second Instar.—The preserved specimens measured from 5.5 to 8.0 mm. long. They are smoky white with purplish-brown tinge especially on the side. The head is dark. The dorsum of the first and eighth abdominal segment is purplish-brown; the dorsal corniculum of the first abdominal segment is distinguishable. The setae of the body are pale with ochraceous tinge. The bases of the setae found on the dorsal and subdorsal areas of the body are white, but the bases of those on the first and seventh abdominal segments, and also of those on the subdorsal area of the third and seventh abdominal segments are dark. The venter, thoracic legs, and prolegs are pale.

The Third Instar.—The alcoholic material measured from 8.5 to 11.0 mm. long. The general color is about the same as in the previous instar. The head is dark brown. The dorsal corniculum of the first and also the eighth abdominal segment is conspicuous, being yellow with slightly yellowish-orange tinge. The tubercles found on the subdorsal area of the first, third, seventh, and eighth abdominal segments, and lateral area of the first abdominal segment are dark or nearly black. But those occurring on the dorsal and subdorsal areas of the thorax and on the second, fourth, fifth, and sixth abdominal segments are nearly grayish-white. The venter and prolegs are pale.

The Fourth Instar.—The specimens preserved in 75 % alcohol measured from 12.0 to 20.0 mm long. The general color is brown. The dorsal bifurcate corniculum of the first and also of the eighth abdominal segment is yellowish-orange, and very prominent. The head is dark brown except certain parts of the front, adfrontal areas, and mouth-parts which are comparatively pale. The subdorsal tubercles of the first three, the seventh and eighth abdominal segments, the lateral tubercles of the first abdominal segment, and some of the subdorsal tubercles of the thorax are dark; the rest of the tubercles are rather pale, nearly white, especially the subventral ones. The venter, thoracic legs, and prolegs are ochraceous.

The Fifth Instar.—The specimens measured from 21.0 to 35.0 mm. long. The general color is about the same as in the previous instar except slightly darker.

The head is 3.312 mm. wide and 2.595 mm. high. The epicranium is mottled in appearance being dark brown marked with light brown and bears numerous conspicuous secondary setae which almost entirely obscure the primary setae. The front is slightly wider than high. The apex of the front is broadly rounded. The apical half of the front is rather small and is wider just below the second adfrontal setae. The frontal punctures are situated slightly above the base and are 0.083 mm. apart. The frontal setae are situated above the level of the punctures and are 0.355 mm. apart. Secondary setae are present on the front. The adfrontal areas meet above the apex of the front at a point slightly more than one and one-half times the height of the front. The adfrontal sutures are slight irregular. The first adfrontal setae are situated on a level above the apex of the front. The second adfrontal setae are situated at about the middle of the adfrontal areas. The interspace between the first and second adfrontal setae is 0.643 mm. Due to the presence of secondary setae the punctures are not clearly seen. The width of the clypeus is 1.023 mm. The clypeal setae are rather nearer the caudad margin than the cephalic margin. The distance between the two first clypeal setae is 0.693 mm. while the interspace between the first and the second clypeal setae is 0.132 mm.

Ocellus I is low and on about the same level as V; the first four ocelli are arranged in an arc of a circle; II is dorso-cephalad of I; III is cephalad of and slightly higher than II; IV is cephalad of and slightly lower than III. V is latero-cephalad of IV; VI is caudad of and slightly lower than V. Ocellus III is comparatively larger than any other ocellus. The interspaces between ocelli II and III and between III and IV are subequal.

The labrum is 0.776 mm. wide and its height is 0.429 mm. The median incision is a comparatively large triangle. The depth of the notch is slightly less than half the height of the labrum.

The body bears tubercles and secondary setae. The dorsal corniculum found on the first and also on the eighth abdominal segment is deeply bifurcate. Tubercles of various sizes are found on the subdorsal, supraspiracular, subspiracular, and subventral regions of abdominal segments 1-8 and on certain parts of the thorax and of the last two abdominal segments; setae are borne on the above mentioned tubercles. A seta borne on the chalaza is found dorso-cephalad of the subdorsal tubercle of all abdominal segments except the first, eighth and last. On the meso- and metatorax the seta borne on the chalaza is directly dorsad of the subdorsal tubercle. The thoracic legs and prolegs are normal. Numerous secondary setae are found on the prolegs as well as on the thoracic legs. The crochets of the prolegs are uniordinal and arranged in a mesoseries, the middle of which is interrupted by a fleshy subcircular projection. The number of crochets of the first proleg is about 28.

The Chrysalis

The chrysalis is 17.0 mm. long and 5.0 mm. in greatest width; it is brown. The cephalic end is broadly rounded while the caudal end is rather pointed as the cremaster is present. The cremaster is a stout short spine, 0.937 mm. long with two very short recurving hooks; each hook bears several small recurving spine-like structures. The labial palpi are exposed as a small triangular area. The maxillae are less than one third of the length of the wings which latter reach the caudal portion of the fourth abdominal segment. The antennae are widest at their proximal ends, taper gradually to the apices, and extend as far, or nearly so, as do the prothoracic legs. The latter are slightly more than half the length of the wing while the mesothoracic legs are more than two-thirds the length. The tips of the metathoracic legs are visible; they reach the caudal margin of the fourth abdominal segment. The eyes are quite prominent. Numerous small punctures are found on the cephalic portions of the abdominal segments. The elliptical dark brown spiracles are conspicuous.

The Adults

The male moths measure from 27.0 to 30.0 mm. across the fore wings, while the females are from 27.0 to 33.0 mm.

Uppercide.—The head and a wide band, from the head to the vertex of the thorax, are dark brown. The thorax and abdomen are grayish-brown. The antennae are light brown with the branches long and reaching the apex. The fore wing is brown with a slightly grayish tinge and is rather narrow. Two pale grayish oblique antemedial lines—the upper portion of the inner one is sometimes inconspicuous—are present; there is a slightly curved postmedial line which bends inward near the inner margin; a pale reddish-brown oblique line connects the outer antemedial line (at about the median nervure) with the postmedial line at the inner margin of wing; the area outside this oblique line is darker especially near the anal area; the discal spot is dark brown with reddish-brown suffusion surrounding it; a series of submarginal dark spots is found from veins 3 to 8; between the post-medial line and the submarginal dark spots there is an inconspicuous yellowish-brown wavy line.

Underside.—The thorax, abdomen, and wings are pale brown mottled with dark brown; the labial palpi and the thoracic legs, especially the first two pairs, are grayish-brown. Each of the four wings possesses an indistinct curved postmedial line.

Melalopha anachoreta (Fabricius), 1787

Melalopha anachoreta (Fabr.) (*Pygaera anachoreta* (F.) or *Ichthyura anachoreta* (F.)) has been recorded from China, India, Ceylon, Java, Siberia and Europe. Several generations per year have been reported, adults being found from April to September.

But in Canton adults appear as early as the middle of February. In Canton, the next to the last instar caterpillars were collected on October 23, 1935. Molting occurred on Oct. 27 and 28. Most of the specimens pupated between November first and fourth. Adults emerged on Nov. 11. Newly hatched caterpillars appeared on Nov. 17. The duration of the first stadium is from 6 to 10 days; second stadium, 7-8 days; third stadium, 7 days; fourth stadium, 10-14 days; and the fifth stadium is about three weeks. The pupal stage lasts about a month or slightly more than one month. Adults emerged on February 15, 1936, laid eggs on Feb. 21, and died on March 3. The last generation of the year requires more than three months to complete the life cycle.

The Eggs

The eggs were irregularly deposited in masses on the rearing jar or on leaves. A small mass consists of 82 eggs. The eggs are yellow, rounded, and flattened on the side which is glued to objects. Specimens preserved in 75 % alcohol measured 0.695-0.708 mm. in diameter.

The Caterpillars

The First Instar.—The first instar caterpillars measured from 2.0 to 5.0 mm. long. The newly hatched caterpillars are pale ochraceous with the head very dark. On the dorsum of the first and eighth abdominal segments there is a dark brown projection. Caterpillars three days old eat very much. The setae of both head and body are very conspicuous.

The Second Instar.—Specimens preserved in 75 % alcohol measured from 5.0 to 8.0 mm. long. The head is dark, nearly black. The ground color of the body is smoky gray. The dorsal corniculum or dorsal projection on the first and also on the eighth abdominal segment is dark; it bears setae and short hairs. The body bears nearly colorless setae on yellow tubercles. The thoracic legs are pale brown.

The Third Instar.—Alcoholic material measured from 8.5 to 14.0 mm. long. The head is brown. The ground color of the body is also smoky gray. The dark dorsal corniculum of the first and also of the eighth abdominal segment is more prominent. The colorless setae borne on the yellow tubercles are quite conspicuous. Short and dark setae are found on the dorsum of the prothorax as well as on the subdorsal area of the meso- and metathorax. The thoracic legs are also pale brown.

The Fourth Instar.—The preserved specimens measured from 15.0 to 25.0 mm. long. The head is dark brown. The general color of the body is smoky gray and marked with many pale, nearly white longitudinal lines. Body bears very conspicuous yellow tubercles in which arise numerous woolly setae. The corniculum of the first and

eighth abdominal segments each bears numerous short dark setae and a few conspicuous colorless long setae. Laterad of the corniculum of the first abdominal segment there is a yellow spot on each side. Therefore when viewed from above two yellow spots with the corniculum in the center are seen. The thoracic legs and also the prolegs are pale brown, the tips of the prolegs being slightly paler. The venter is pale greenish smoky gray.

The Fifth Instar.—The fifth instar caterpillars (preserved in 75 % alcohol) measured from 25.0 to 35.0 mm. long. The head is dark brown, nearly black. The general color of the body is dull dark smoky brown, especially on the lateral areas. The dorsum is much paler. Tuberles of the body are orange-colored and possess woolly white setae. The spot on each side of the corniculum is yellowish-white. The corniculum on the first and also on the eighth abdominal segment is brown in color. In addition, this species differs from *M. anastomosis* in that the dorsal cornicula are not bifurcate, the apex of the front is slightly rounded, the width of the front is gradually increased towards its base, the interspace between ocelli III and IV is shorter than the distances between ocelli II and III, or between I and II; and the seta located dorso-cephalad or directly dorsad of the subdorsal tubercle is almost entirely obscured by the secondary setae.

The Chrysalis

The size and color of the chrysalis of this species are about the same as in *M. anastomosis* (L.). No preserved material was available for making a detailed study.

The Adults

The male moths measure from 27.0 to 32.0 mm when the wings are spread, while the females are 30.0 to 39.0 mm.

Upperside.—The head, thorax, fore wings, and tip of the abdomen are grey-brown. There is a very dark brown streak from the vertex of the head to the vertex of the thorax. The hind wings and abdomen are fuscous. On the fore wing there are two pale oblique antemedial lines the outer one of which bends outward near the inner margin. The postmedial line is wavy above vein 3; there is some reddish-brown suffusion outside the wavy portion. The apical area beyond the cell is dark brown, slightly paler near the apex, and extends to vein 3. An indistinct series of submarginal dark brown spots is present but the spots found between veins 2 and 3 are conspicuous and placed further from the margin.



Melalopha anachoreta
(Fabr.)

Underside.—The labial palpi, thorax, and thoracic legs are grey brown. The fore wings are slightly brown while the hind wings and abdomen are pale fuscous. Each wing also possesses an indistinct curved postmedial line.

References Consulted

ESAKI, T., ET AL.

1932. *Iconographi Insectorum Japonicorum*. 4 (unnumbered), 97, 123, 51, 2241, and 24 pages, 24 colored plates, 4434 text figures, 1 table. Hokuryukan, Tokyo.

HAMPSON, G. F.

1892. *Fauna of British India including Ceylon and Burma. Moths.* Volume 1, xxii and 527 pages, 333 text fig., Taylor and Francis, London.

KIRBY, W. F.

1871. *A synonymic catalogue of diurnal Lepidoptera.* v and 690 pages. Gurney & Jackson, London.

誌 两 種 天 社 蛾

(鱗翅目:天社蛾科)

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(摘要)

本文敘述兩種天社蛾 *Melalopha anastomosis* (L.) 及 *M. anachoreta* (F.). 二者皆以粘米粃之葉為其食料。對其生活史及各期之描述皆見文中。

SHORTER ARTICLES AND SCIENTIFIC NOTES

Supplement to McClure: Native Paper Industry in Kwangtung.¹

—During the course of a series of experiments on papermaking, the writer recently had under his direction several experienced Chinese paper-makers for a period of about three months. Since native methods and modifications thereof were used, all aspects of the techniques used by these artisans became more or less familiar. On the basis of his observations, the writer wishes to offer some notes on the *dipping process* and on the *construction of the drying oven*, which are deemed a useful supplement to Professor McClure's paper.

The Dipping Process

* When compared with the European method, the Chinese method of papermaking is particularly interesting because the freshly dipped sheets are placed one upon the other as they are removed from the screen, and pressed, without the use of "felts" to separate them, after which the individual sheets are removed from the stack without difficulty. The practical importance of this technical achievement justifies the description of the method by which it is accomplished.

No matter how many times the mold is dipped into the pulp suspension (one to two or three times) to form the sheet, after the

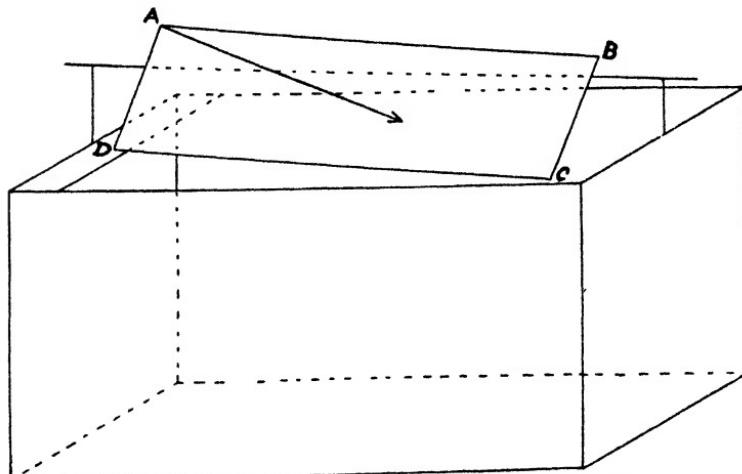


Fig. 1. Diagram of dipping vat, with paper mold (ABCD) in drawing position.

last time the mold is brought to rest in the position shown in figure 1 as soon as the sheet is firm enough to adhere to the screen. The

¹ Ling. Sci. Jour. 5(3):255-264, pl. 11-14, 1927.

free water still remaining in the pulp drains toward the corner C, giving to the surface fibers an orientation in the direction A-C. After a moment the flexible screen is lifted from the supporting frame and inverted, bringing the sheet of pulp into position on top of the stack of sheets already dipped. All of the sheets go onto the stack with the same orientation. The corner corresponding to the position A is marked, and after the stack has been pressed to remove the excess water, the edges of the block of moist sheets are trimmed to clear away the more or less tangled fibers adhering to the margins of the contiguous sheets. The operation of separating the sheets from each other then proceeds, always from the corner A. The significance of this technique lies in the fact that the removal of the sheets always proceeds in the direction of the superficial layer of fibers (A-C) mentioned above.

The Construction of the Oven

A diagrammatic representation of the plan of the drying oven is shown in figure 2. The most important features of the oven are (1) the plaster with which it is covered, and (2) the nature of its surface. The plaster is composed of one part of first grade lime and one part of wet bamboo pulp. The two are trodden together,

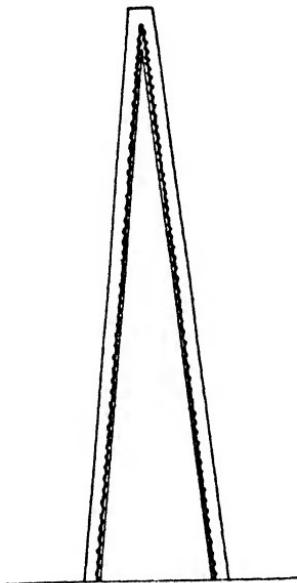


Fig. 2. Cross-section of drying oven, showing lattice and plaster construction.

with just enough water to make a soft, plastic mass. The average workman will prepare about 100 lbs. of this plaster in one day.

The plaster is allowed to age for two or three days before being used. The function of this aging process probably is to allow a part of the lime to absorb carbon dioxide. The calcium carbonate formed makes possible the achievement of a smoother surface than raw lime plaster would take. The plaster is applied to the latticed framework in a layer about one-half inch in thickness. When it has hardened sufficiently, the surface is pressed and smoothed with a heavy trowel. The surface is then rendered waterproof by rubbing with raw Wood Oil. Upon drying, this leaves the surface smooth and shining. Finally, a thin coat of rice paste is spread on with a cloth. As the moist sheets of paper are pulled from the pressed block, they are applied to the warm surface of the oven by means of a brush. The starch coating serves the function of causing the sheets to adhere to the oven until they are thoroughly dry. When the sheets begin to loosen from the surface of the oven before they are quite dry, another coat of starch paste is applied.

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補述莫氏廣東製紙業之研究

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(摘要)

我國所製之紙，每頁直接置於他頁之上，而二者之間，全無物體以離隔之。經壓機壓製之後，各頁可如舊折開，蓋各頁面其原料之纖維皆向一定之方向也。至於所應用乾爐之構造，及其他之用具等皆詳見於圖。

Notes on Chinese Plants.—In this short paper are gathered together a few notes, for the most part on Kwangtung plants, which have accumulated recently during a study of current literature and of the flora of southeastern China. Included are distributional notes, new records for Kwangtung, and in one case the description of a fruit type to a species previously known only from flowering material.

DIOSCOREACEAE

Dioscorea Linnaeus

Recently Prain and Burkhill (Bull. Misc. Inform. Kew No. 9, p. 494, 1936) described a new species, *Dioscorea hainanensis* from Hainan, citing *W. T. Tsang* 787 as type and 604 as paratype. As the number cited may represent two or three collections of plants, not all of which are *Dioscorea* and as they represent Lingnan University collections with which I am familiar, I wish to add a brief note to make it more easy for others to follow and locate this material.

This particular *W. T. Tsang* 787 (there are others) was distributed as *LU* 16286, collected on Sept. 10, 1927, from Mei Yueng Ts'uen, Tan-hsien District. (Plant 5 ft long, yellow flower, Chinese name *Chuk Yun Tang* 強飲藥.)

W. T. Tsang 604 was distributed as *LU* 16103, collected August 25, 1927, from Tiu Woh, Sha Po Shan, Tan-hsien District. (Plant 5 ft. long, yellow flower, Chineses name *Kau Leun Shue* 狗卵薯.)

LARDIIZABALACEAE

Holboellia Wallich

H. grandiflora Reaubourg, Bull. Soc. Bot. France 53: 453, 1906; Rehder and Wilson, Sargent's Pl. Wils. 1: 346, 1913.

Characterized by large flowers (3 cm. long), 4-5 large leaflets prominently reticulate (15 cm long), broadest above the middle, and with a curved, acuminate tip

KWANGTUNG: Yam Na Mt., 'CC 14124 (Chan Kwai Shang). Sterile, no flowers but identified by means of *Wilson* 3139 (R. & W. l.c. and photograph, Lingnan University) First record for Kwangtung.

SAXIFRAGACEAE

Deutzia Thunberg

D. Chunii Hu

The type of this species, namely *Cheng* 4750, in the original description by Dr. H. H. Hu (Jour Arn. Arb. 6: 141, 1925) was credited to Chekiang, without precise locality. A duplicate of the specimen is available here at Lingnan University with the original label which states that the specimen was collected

May 30, 1924, from Chu Hwa Shan, Anhwei. The species has subsequently been found in Chekiang, but the type is from Anhwei.

HAMAMELIDACEAE

Rhodoleia Hooker

R. Championi Hook., Bot. Mag. pl. 4509, 1850; Bentham, Fl. Hk. 131, 1861; Forbes & Hemsl., Jour. Linn. Soc. (London) 26: 39, 1887; Dunn. & Tutcher, Fl. Kw. & Hk. 101, 1912; Herklots, Hong Kong Nat. 3 (3 & 4): 201, fig. 6, 1932; Exell, Sunyatsenia 1 (2 & 3): 96, 1933.

This species since its first discovery in Hong Kong by Captain Champion, who sent specimens of it to Kew in December, 1849, has been found only in the colony and not from the mainland. The recent discovery of this beautiful species from the mainland can be attributed to the collector W. T. Tsang who located flowering material of this species from Naam Kwan Shan 南昆山, Tseng-ch'eng District 增城縣, April 5, 1932, *Tsang* 20116. I believe this is the first record for the species outside of the colony of Hong Kong. Subsequently collected in 1934 from Loting, Lam Chuen 9481, and Sunyi, Wong 38197 (Botanical Institute, Sun Yat-sen University), and in 1936 by S. K. Lau 27382 from Haiuan (Botanical Institute, Sun Yat-sen University).

Distylium Siebold and Zuccarini

D. myricoides Hemsl., Icon. sub. t. 2835, p. 2, 1907; Dunn, Jour. Linn. Soc. (London) 38: 359, 1908.

The type of this species is from Fukien, but no locality was given. Originally no description of the fruit was included. Below is given the description of the fruit as well as the original distribution and additional recent records from Chekiang, Kwangtung and Anhwei.

DESCRIPTION OF FRUIT: Capsula ovoidea, cum stylis erectis aristatis, circiter 1.2-1.5 cm. longa, 8 mm. lata, dense appresse stellato-puberula.

Capsules ovoid, about 1.2-1.5 cm. long and 8 mm. diam. appressed stellate puberulous, splitting into 4 parts, awn-tipped.

DISTRIBUTION: FUKIEN. Fay Kay Tze, 1450 ft., Dunn 360 (HK 2684), syntype of flower with original drawings at Kew, photograph at Lingnan University; no locality, Dunn 163 (HK 2684) in Hong Kong Bot. Garden and in Arnold Arboretum; Dunn (HK 2685), syntype of flower at Hong Kong Bot. Garden; Yenping, Buong-Kang, 500 m., Chung 3328 (Arnold Arboretum). W. CHEKIANG. Pin Kan, Ning-hwi, Ching 3293, syntype of fruit at Arnold Arboretum and photograph at Lingnan University; and Keng 1147 (Arnold Arboretum). KWANGTUNG. Fan Shiu Shan, Wang Yuen Lau 2568, syntype of fruit at Lingnan University; and Tso 20869 (Arnold

Arboretum and Botanical Institute, Sun Yatsen University). S. ANHWEI. Wang Shan, Ching 3026 (Arnold Arboretum and Lingnan University).

FRANKLIN P. METCALF

CURATOR OF HERBARIUM

LINGNAN NATURAL HISTORY SURVEY AND MUSEUM

華產植物誌

麥克福著

嶺南大學自然博物採集所植物標本室主任

(摘要)

本文述五種植物之分佈，及描述蚊母樹 (*Distylium myricoides* Hemsley) 之果。上述五種，分隸五屬，共分四科。

The Life History of *Papilio sarpedon* Linn., 1758 (Lep.: Papilionidae)¹ The favorite food-plant of *Papilio sarpedon* Linn. in Canton is *Cinnamomum pedunculatum* (Thunb.) Ness. This is not the sole food-plant, however, for three caterpillars were found on *Desmos cochinchinensis* Lour., and one each on *Michelia champaca* Linn. and *Magnolia coco* (Lour.) DC. Young caterpillars were obtained during the first week of October, 1936, and mature larvae toward the end of the month. One of these, which pupated on Oct. 27, spent the winter in the chrysalid stage and emerged on March 30, 1937. The eggs, placed singly on the upper or lower surface of young leaves or on young shoots of *C. pedunculatum* were found (during 1937) from the end of April to May 10 and during the second and third weeks of June. Young caterpillars were found at the end of April, during the first ten days of May, and throughout June. Frequent field trips were not made and no collecting at all was done from July 1 to September 30. The duration of the egg-laying period was not determined nor was the preoviposition period determined so it is not known whether there were three generations completed during the months of April, May, and June or whether the caterpillars collected during this period were the result of the adults laying eggs over a period of at least two months. It is believed, however, that generations were represented. The development from egg to emergence of adult required about a month during spring and early summer. If breeding continued during the three month period July to September it probably would have been accelerated by the higher temperature. From the time standpoint, therefore, there may be as many as seven generations per year.

The Egg

The eggs (pl. 6, a) are laid singly and their location is not very specific. The egg is smooth, spherical, and slightly flattened at the point of attachment. It is 1.0 to 1.26 mm. in diameter. When newly laid the egg is dull whitish but later it changes to yellowish-green with some tiny brownish spots. The egg darkens shortly before hatching. The exact incubation period was not determined but it is known to be more than five days.

The Caterpillars

There are five instars and the duration of the stadia is from one day to one week. The caterpillars (pl. 6, b) are cylindrical, enlarged at the anterior end to the metathorax, gradually reduced

¹Contribution from the Lingnan Natural History Survey and Museum, Lingnan University, Canton, China.

The writer is indebted to Mr. W. E. Hoffmann, Director of the Natural History Survey and Museum, for assistance in the preparation of this paper.

to the posterior end. The caterpillars are quite sensitive and when disturbed protrude the pale yellowish osmateria with their strong odor.

First Instar.—The first instar larvae measure 3 mm. in length and 0.765 mm. across the head. The head is dark brown and the body is pale yellowish-brown with a pale band in the middle of the abdomen. The body, except the venter and legs, is covered with setiferous tubercles of the scolus type. There are three pairs of dark subdorsal thoracic spines, one pair on each segment, which bear fine branches which are forked at the tips. There is a caudal pair, which is whitish and larger than the others, and bears straight and needle-shaped branches. The venter and legs are pale. The duration of the first stadium is three days.

Second Instar.—The caterpillars are from 5 to 6 mm. in length and 1.225 mm. across the head. The ground color is dark greenish; the head pale and the thorax smoky-black. The three pairs of subdorsal thoracic spines are dark with a touch of dark metallic blue, bearing a few short and simple setae. The length of the spines is as follows: 1.2, 0.7, and 0.9 mm. The caudal spines are whitish with straight black setae. The body is covered with numerous very short and fine dark setae measuring 0.045 to 0.13 mm. in length. A pale whitish narrow lateral band is present above the prolegs. The venter and legs are palish green. The average duration of this stadium is 1.5 days.

Third Instar.—The length of the caterpillar is from about 7 to about 12 mm.; width across head 1.89. The duration of the third stadium is from 2 to 3 days. The general color is dark green; the head pale. The length of the three pairs of subdorsal thoracic spines is as follows: 2.7, 0.63, and 2.8 mm. The caudal pair of spines is pale, with black on the side near the tip. The body possesses some fine setae but these are not so dark as those of the previous instar. The venter and legs are palish green.

Fourth Instar.—The length of the caterpillar is from 14.5 to 17 mm. and the width of the head is 2.70 mm. The duration of the fourth stadium is from two to three days. The caterpillar is green and fat, with a yellowish band connecting the bases of the metathoracic subdorsal spines. The thoracic spines are metallic bluish-black and the length is as follows: 0.9, 0.6, and 1.1 mm. The body possesses some very faint yellowish markings especially on the sides. The caudal spines are dark for about the apical half. In other respects the larva resembles the previous instar.

Fifth Instar.—The last instar caterpillar measures from 22 to 33 mm. in length and 3.69 mm. across the head. The duration of the last stadium is from 4 to 7 (av. 6) days. The length of the three

pairs of spines is as follows: 0.31, 0.18, and 0.9 mm. The metathoracic spines are yellowish with a black band on the basal half. At the extreme base there is also a thin black line. Both the band and the line are replaced on the inside of the spines by the yellowish band which connects the two spines. The caudal spines are black for the apical half on the inside and for the entire length on the outside.

The Chrysalid

The general color of the chrysalid (pl. 6, c) is palish green. It is 30 mm. in length, 10 mm. in greatest width, and 8 mm. in greatest height. The duration of the pupal stage is about ten days during the second half of May. One specimen which pupated on Oct. 27 emerged the following March 30. The cephalic end truncate; the thorax dorsally produced into a conical process which is blunt at the tip. It is 13 mm. in height if measured from the ventral part of the thorax to the tip of the process or horn on top of the thorax. The abdomen is somewhat cylindrical and tapers greatly posteriorly - near the apex it is square instead of cylindrical. There are four yellowish ridges extending from the thoracic process. One longitudinal median line or ridge extends forward to the truncate head and backward to the metathorax where it divides into two subdorsal ridges which extend to the posterior end of the chrysalid. A lateral ridge on either side extends ventrad and caudad, passes just above the developing wings and continues, as a subventral line, to the caudal extremity. There is also a pair of thinner lateral ridges, about midway between the anterior median ridge and the lateral ridge above referred to. This originates at the base of the process at which place it is joined with the lateral ridge. It extends downward and slightly caudad but does not extend far enough ventrad to touch the antenna. The chrysalid is attached head upward to its support by the posterior end and is held in position by the silken girth around the thorax.

The Adult

The butterflies (pl. 6, d) are from 55 to 68 mm. across the fore wings. Male and female, upperside: ground color dark, nearly black, with markings of a delicate greenish tinge. A very conspicuous and semi-hyaline and broad medial band, which is broadest in the middle, extends from the interspace 2 on the hind wing to near the apex of the fore wing. Part of the band which crosses interspaces 6, 7, and 8 on the hind wing is whitish; a submarginal series of slender lunules is found in interspaces 3, 4, 5, and 6. The antennae, head, thorax, and abdomen are black. Underside: the ground color is brownish-black. The markings, pale green tinged with pale blue, are similar to those on the upper side. In addition, a short subbasal band—from the costal margin to the subcostal vein

—and a postdiscal area between the medial band and the submarginal lunules, up to vein 6, are marked with crimson. A crimson spot is found near the anal angle, and a yellowish spot occurs below it. The labial palpi, head, thorax, and abdomen are largely gray.

誌翠帶鳳蝶之生活史(鱗翅目;鳳蝶科)

曾慶雲著

嶺南大學自然博物採集所動物部技佐

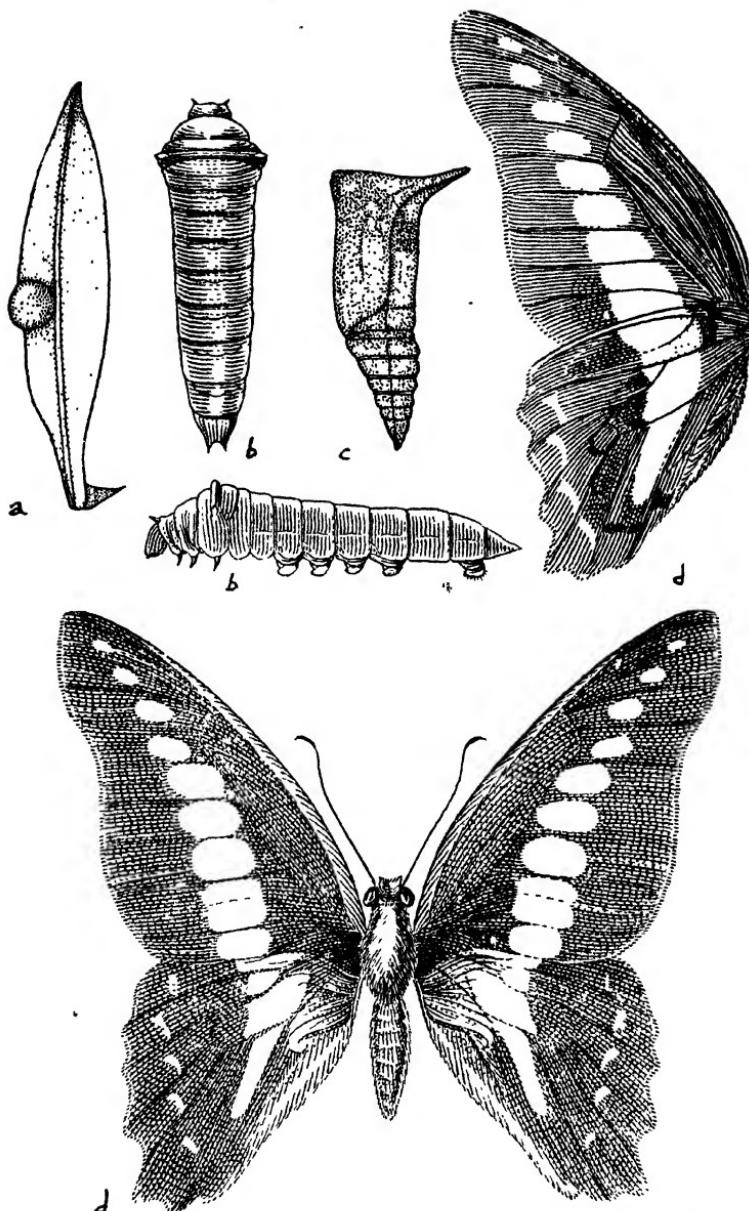
(摘要)

本文記載翠帶鳳蝶之生活史。其所經各期，則如圖所示。此虫以陰香為其主要食料；此外幼虫，亦曾採自其他三種之植物。每年四月下旬，發見其卵，由卵至成虫，約需一月有奇。此虫以蛹越冬。

H. W. TSANG (TSANG HING WAN, 曾慶雲)

ASSISTANT IN ZOOLOGY

LINGNAN NATURAL HISTORY SURVEY AND MUSEUM



Papilio sarpedon Linn.; a, leaf showing egg; b, dorsal and lateral views of larva; c, lateral view of chrysalid; d, adult, dorsal view and also under surface of wings. (a and b drawn by T. W. Lo; the other figures by Jose Gomez.)

Life History Notes on the Crucifer Sawfly.¹—On March 6, 1933, several sawfly larvae were collected on the university campus. They were about 15 mm. long, the body dark blue or purplish, hairless, and with a black dorsal median line. They were feeding on the leaves of watercress, *Roripa Nasturtium-aquaticum* (L.) Schinz & Thellung, known in Chinese as Sai Yeung Ts'oi (西洋菜). At that time only four specimens, all nearly full grown, were collected. Two of them died when trying to enter the soil, one was preserved in the pupal stage, the fourth successfully emerged as an adult on March 31. From March 10 to April 3 the writer searched for additional specimens but did not find any. On April 9, nine specimens were found. These were about 13 mm. long. One of these died on April 12, one died in the pupal chamber while still a larva, two were killed by Hymenopterous parasites. The remaining five emerged from April 26 to 28. All of them were females and during the period April 27 to May 3 they laid thirty-nine eggs. The eggs hatched from May 3 to 10 and adults appeared from May 25 to June 1. Reproduction, therefore, was parthenogenetic. All of the adults of this lot were males.

On April 10, nine eggs were collected. They were laid individually, inserted in the "lges of leaves. The dates on which the eggs were laid were, of course, unknown. On April 11, six eggs hatched and one egg was preserved for later study. The other two eggs did not hatch. These six larvae produced adults from May 7 to 9.

The Egg.—The color of the eggs is yellowish-green. The eggs were not studied at the time of rearing and the one which was preserved has, in the meantime, been destroyed by drying out. The incubation period was from 5 to 6 days for eggs which were laid on April 27. When the eggs were ready to hatch the color changed to grayish-green and the leaf at the point where the eggs were inserted became very shining.

The Larval Stage.—The larva (fig. 1.) is described from a nearly grown specimen. The body is dark blue or purplish, hairless, with very fine transverse wrinkles. There is a dorsal median blackish line from the second thoracic segment to the posterior end of the body. On the side of each abdominal segment there is a more or less roundish black spot; there are two similar but smaller spots on the mesothorax and on the metathorax. The spots on the thorax are arranged

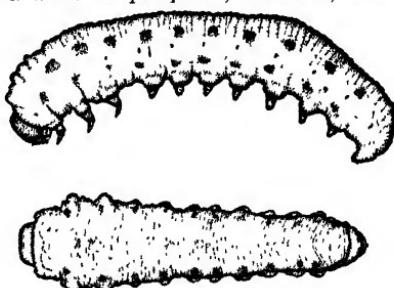


FIG. 1. Larva.

¹ Contribution from the Lingnan Natural History Survey and Museum, Lingnan University. The writer is indebted to the Director of the Museum for suggestions in connection with the writing of this paper.

one ahead of the other and together with those on the abdomen form a longitudinal row. On each abdominal segment, located beneath the black roundish spot, is a dark, irregular, smaller spot. The head and legs are black. The newly hatched larvae are about 2.3 mm. long; the full grown larvae about 17 mm. The larva of this insect is the stage which is harmful to the host-plant. As soon as the larvae hatch they begin to eat. They are not very active when compared with the larvae of other insects. They remain on the same leaves until they are consumed, then attack leaves nearby. They like to feed on the leaves at the edge of the blades and seldom feed on stems. The total larval period was 12-13 days in the April generation, 9-10 days in the May generation. There were five larval instars in all but two cases where there were six instars.

The Pupal Stage.--When the larvae were full grown they entered the sand and made chambers or cocoons by mixing the sand

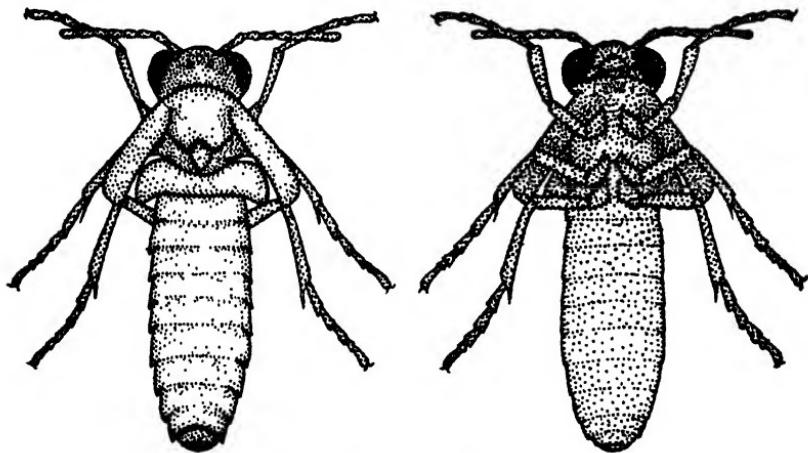


Fig. 2. Dorsal and ventral views of pupa.

together with a little silk-like sticky secretion. In the chambers they transformed from the larval to the pupal stage. These chambers usually were made on the bottom of the Petri dishes and had no sand on the lower side. They could easily be seen through the glass, and in this way I could note the exact pre-pupal period. Some of them stayed in their chambers as larvae for a long period before they finally pupated. In the May generation the prepupal stage varied from 6 to 12 days for specimens which entered the chambers on May 11 and 12. The pupal period was from 4 to 7 days. After the larvae constructed the chambers their bodies became shorter and the color became lighter. The blackish dorsal median line and the black spots on either side of the body almost disappeared. The appearance of the pupa (fig. 2) is almost the same as that of the adult except their wings are not fully expanded. When they have

just pupated, they are very sensitive to light. The color of the head is bluish-green and the rest whitish-yellow. Later on the abdomen changes to greenish-brown, the thorax to reddish-yellow, head and antennae to black, while the legs change to yellowish-brown and still later the tarsi and apices of tibiae turn black. The wings also change to black and gradually expand. After becoming adult the specimens remain in the chamber very quietly for one or two days, then cut a round hole at one end of the chamber and crawl out.

The Adult Stage.—When an adult (fig. 3) just comes out of its chamber, it stays close to the chamber and rests for four or five minutes. It then brushes its face, antennae, and wings with its legs. After that it moves forward a little and then begins to fly in the breeding cage. The adults were not seen to feed but they did take a little moisture. The adults began to lay about 24 hours after emergence. Before egg-laying the adult searches for a suitable place, testing the leaves with her ovipositor. After laying one or

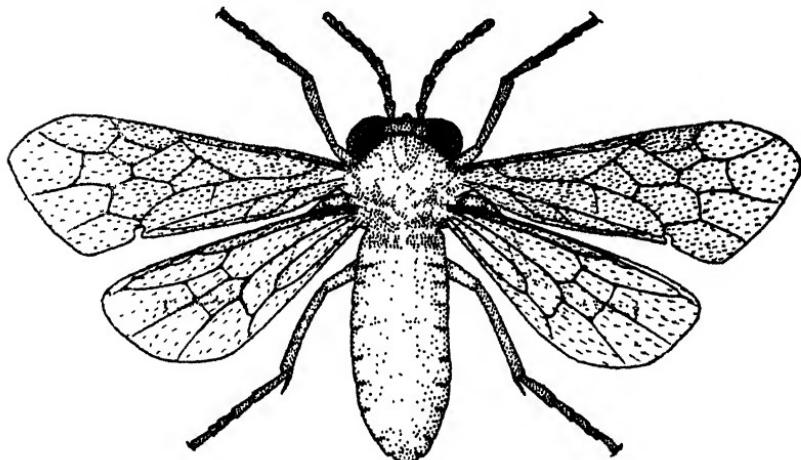


Fig. 3. Adult

two eggs the female brushes the abdomen with the hind legs and the antennae with the front legs. One individual laid 6 eggs while four specimens which were kept in a common container laid 39 eggs.

The Adult.—Head, including antennae, blackish-blue; prothorax orange; meso- and metathorax brown; wings dark brown; abdomen yellowish-brown. Beneath: thorax and abdomen orange; legs orange with the tarsi, hind tibiae, and apices of front and middle tibiae black. The species is thought to belong to the genus *Athalia*.

Food-plants.—The common food-plant of this insect is Watercress as mentioned above. This plant is fairly extensively grown in Canton and vicinity and sometimes the damage done by this insect

is severe. The writer attempted to feed the larvae on cabbage, Chinese Cabbage, Chinese Kale and lettuce. The larvae fed on the Chinese Kale and grew satisfactorily but did not eat any of the other plants.

Figure 1 was drawn by K. C. Lee; figures 2 and 3 by T. W. Lo.

Y. W. DJOU (DJOU YU WEN, 周郁文)

ASSISTANT IN ENTOMOLOGY

LINGNAN NATURAL HISTORY SURVEY AND MUSEUM

十 字 花 科 植 物 之 鋸 蜂 生 活 史

周 郁 文 著

嶺 南 大 學 自 然 博 物 探 集 所 技 佐

(摘要)

本文所述之鋸蜂，暫鑑定歸於 *Athalia* 屬。此虫之卵期，由五至六日；且共需九至十三日以完成五齡之發育。前蛹期六至十二日；蛹期四至七日。成虫羽化後，約需廿四小時始行產卵。至於每雌蜂能產卵若干，雖未經詳細研究，但最少亦有十枚。此鋸蜂以西洋菜為其主要食料，故間亦有被害甚烈者。

The Nidification of the Bamboo Bee, *Xylocopa dissimilis* Lepel.
('Hymenoptera: Xylocopidae).—On October 9, 1936, Mr. H. Fung of the Lingnan Natural History Survey and Museum staff brought in a portion of a bamboo culm containing a specimen of the large black carpenter bee known locally as *Chuk Fung* (竹蜂) or Bamboo Bee. The upper end of the internode had been sawed off and the portion brought to me was ten and one-fourth inches long. The culm was from 21 to 24 mm. in diameter, and seven inches from the base a round hole 9 mm. in diameter had been made through the culm wall, which was 3 mm. thick. The culm was placed in a large glass jar over which was placed a screen cover. Although observed from time to time during the next week the bee was never seen to leave the culm. It was seen at the hole several times with its head against the opening. On one occasion I accidentally got my finger across the hole while examining the culm and received a sharp sting for my carelessness. On October 17, I made several attempts to pull the bee out by means of a forceps and although I could get a very firm hold of the specimen I could not pull it through the hole. When I released her she made no attempt to move away from the entrance. During the whole of the time she was disturbed she made many rapid thrusts with her stinger. Finally I anaesthetized the specimen with chloroform, but only with difficulty could I pull her through the hole because her diameter seemed to be as great as that of the hole. By comparing the specimen with material in our collection named by S. A. Rohwer, J. Sonan, and T. C. Ma it was learned that the specimen belonged to the species *Xylocopa dissimilis* Lepel. and was a female.

When the culm (fig. 1) was brought in there was, in the upper (cut) end, a ball of yellowish-brown, slightly aromatic pollen attached to the side of the culm. Beneath the pollen was a grub. (Above the pollen could be seen the remains of another partition.) The grub was white and shining and 30 mm. in length. It was removed to a Petri dish and was to have been killed and preserved but it was forgotten and did not come to my attention again until October 17. By this time it had passed considerable excrement and was noticeably smaller. Its ball of pollen was now given back to it. The grub was not observed again until November 6. In the meantime it had eaten some of the pollen and had tried to pupate but failed in the attempt and was nearly dead.

The culm was explored on October 17. The partition or wall in the culm on which the above-mentioned grub was found was removed. It was about .4 mm. in thickness, brownish-yellow in color, and of the texture and appearance of a poor grade of paper. Removing this partition revealed another chamber containing two grubs and a small portion of pollen. The end of the culm was now stoppered with a cork. Some incisions made in the culm below the chamber which had been occupied by the adult revealed several

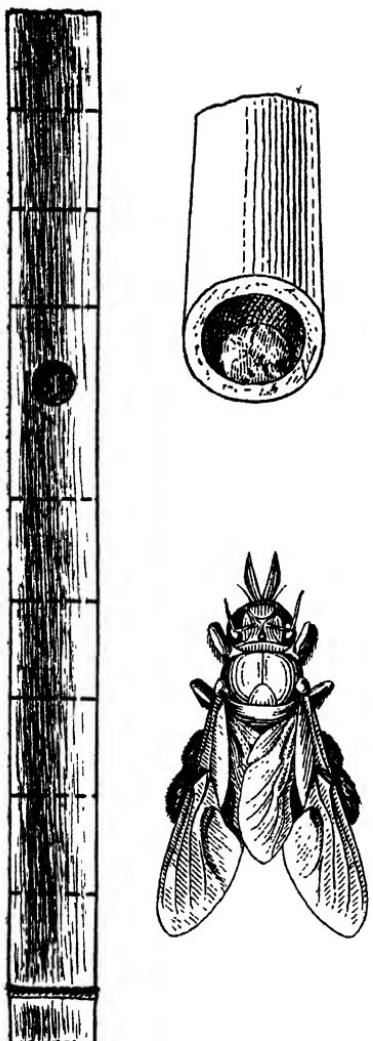


Fig. 1. *Agyacopa dominica* Lepel. Left, portion of bamboo culm showing the entrance hole of the adult, above and below which are 2 and 5 larval chambers, respectively. Right, upper, end of culm showing ball of pollen. Right, lower, free-hand sketch of adult female. Drawings by J. Gomez.

chamber from the end of the culm. On the other hand about four inches of culm were cut off and there would have been room for three

more chambers each containing one grub. Without disturbing the grubs the apertures were closed and the culm put aside.

On November 6, the culm was again examined. The cell which had contained the two grubs now contained two pupae which from the appearance of the wing pads were about ready to become adult. Four dead larvae and one dead pupa were removed from the five cells or chambers between the adult chamber and the lower end of the culm. Death was probably due to drying out, for the chambers had been sealed with paper only. The two live pupae were preserved (by different methods) as we were anxious to have a specimen suitable for illustration. If I am right in believing that the pupal period was about at an end, the time required for pupation would be three weeks or a little more. If this is the case, the winter is probably spent in the adult stage in the pupal chamber, for adults are not seen afield during the winter months. How much longer the mother of the colony would have lived can only be conjectured.

Whether there were more than two chambers above the adult chamber is not known. As mentioned earlier there had been a third partition but this may have only separated the

or four more chambers. The lengths, in millimeters, of the chambers from the upper to the lower end of the culm are as follows: 23, 22, 60 (adult chamber), 20, 24, 26, 24, 24. The accompanying sketch (fig. 1) is inaccurate in representing the last chamber as extending to the node. The last partition was placed 10 mm. above the point where the hollow of the culm decreased in diameter and 20 mm. above the actual node. Recapitulating, the culm contained at least seven pupal chambers, six of which contained one grub each, while the seventh contained two grubs.

The pupae are 18 mm. long. The width is as follows: head across eyes, 7 mm.; width across thorax excluding wing pads, 6

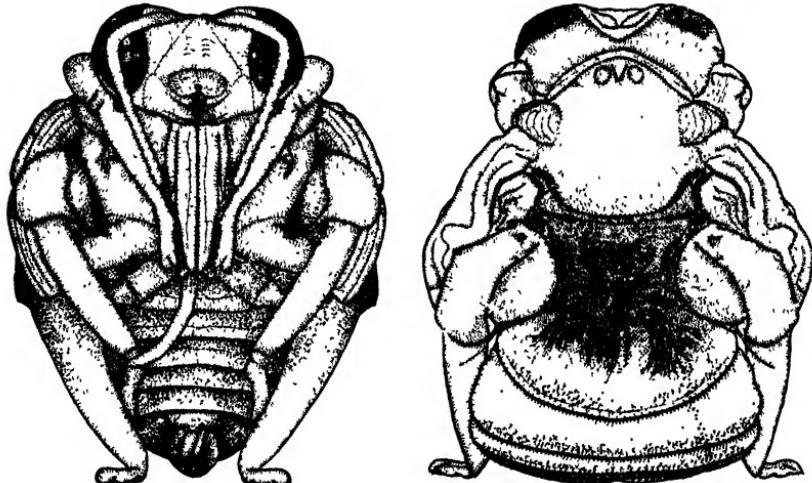


Fig. 2. Ventral and dorsal views of the pupa of *X. dissimilis* Lepel. Drawings by T. W. Lo.

mm., width of thorax across wing pads, 12 mm., width of abdomen, 10 mm. The pupa is cream colored with dark eyes. Detailed structure of the pupa may be seen in figure 2.

In conversation with Mr. Fung, I am informed that this species is very commonly found in bamboo culms and that various stages of the insect may be found in the same culm at the same time. The specimens in the culm above referred to were all in the same stage of development, but Mr. Fung, who has spent a great deal of time working in the Bamboo Garden under the supervision of Dr. F. A. McClure, has had a good opportunity to make observations and what he says may well be true. He says that these bees do not work in living bamboos. Dr. McClure kindly informed me that the bamboo in question is an edible species of *Dendrocalamus*, introduced by him from Kwangsi Province and known by the common name *T's'ing T'im Chuk* (青甜竹). He also informed me that he had recently observed the entrance holes of this bee in a species

of *Bambusa* in a hedge at Fauling Gardens of the Botanical and Forestry Department, Hong Kong.

The following localities and dates taken from mounted specimens in our collection give some idea of the distribution and time of appearance of this species. Canton and vicinity, April 15 to September 12. Chung-shan District, July. Su-wen District, July. Mei District, various dates from July 31 to October 26. Meu-ming District, July. Ch'eng-hai District, July and August. Lien District, August. Hainan Island: Kiung-shan District, April and July; Tan District, March, April, June, and July; Yai District, May. Kwangsi Province: Wuchow, Ts'ang wu District, July 25; Sung-sheu District on August 5. Fukien Province: Cha-shan, Kien-ning District, June; Foochow, Minhow District, August 28 to September 25. No effort has been made to obtain early or late seasonal records by paying particular attention to this species, but April 15 and September 22 probably are quite representative. The specimen under discussion was collected in a culm on October 9 as already mentioned, while a number of specimens were taken in bamboo culms on March 8, 1937. It would appear that for about half of the year this species, in the vicinity of Canton, is found inside bamboo culms.

These specimens were collected by various staff members of the Lingnan Natural History Survey and Museum. Miss Y. C. Ng, who collected the species in Swatow, observed that they visited the flowers of papaya (*Carica papaya* L.). In the vicinity of Canton they have been found on the flowers of many Leguminosae, *Hibiscus*, *Eugenia*, *Duranta repens* L., *Crotalaria saltiana*, and numerous other plants. The visitors to flowers are predominantly females and they show a special preference for plants with inverted flowers.

Recently I have made an attempt to find, in the literature, references to biological information on this or related species. Bingham in Fauna of British India, Hymenoptera, Vol. 1, p. 534, 1897, says that in India and Burma *Xylocopa* spp. bore into the bamboos used in thatched houses, cutting neat round holes as entrances to their nests. Sharp, in Cambridge Natural History: Peripatus, Myriapods, Insects, Part 1, page 170, 1910, figures the larva and pupa of *X. violacea* F., the drawings being quite similar to, but different from, those of *X. dissimilis*. This is a European species which will form its nest in most any kind of dried wood. Sharp, in Part 2 (1918) of the same work, page 34, remarks: "*Xylocopa chloroptera* in E. India selects a hollow bamboo for its nidus: it cements together the pieces obtained in clearing out the bamboo, and uses them as horizontal partitions to separate the tube into cells." T. C. Ma, writing in Chinese in *Entomology and Phytopathology* 4 (3 & 4): 60, 1936, recorded this species on wheat and gives the names (in Chinese) of three plants the flowers of which

it visits. The plants referred to are, apparently, the following: clover, *Astragalus sinicus* L.; buckwheat, *Fagopyrum esculentum* Moench.; thistle, *Cirsium japonicum* DC.

The adult is a broad, robust, black species with purple wings, which are metallic green toward the apical margins. A detailed description of the adult is given on page 538 of the work by Bingham mentioned above.

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LINGNAN NATURAL HISTORY SURVEY AND MUSEUM

LINGNAN UNIVERSITY

竹蜂之營巢法 (膜翅目: 篓藻科)

賀 輔 民 著

嶺南大學自然博物採集所

(摘要)

本竹蜂 (*Xylocopa dissimilis* Lepel.) 之巢，乃建於竹幹中。曾見成虫於一長六十 mm. 之穴中，在成虫穴上，再見二室，而在其下則有五室。蛹室長由二十至二六 mm. 所見之幼虫室，以一虫居於一室者凡六處，其他則以二虫同居於一室，每幼虫各備花粉一球。至於此虫之描述，所探之花類，與發見之地名，皆見文中。

Records of Coleoptera, Hymenoptera, and Isoptera from the Island of Hainan.—I wish to record at this time some further identifications of insects from the Island of Hainan. These insects were collected by the Lingnan University Fifth Hainan Expedition.¹ The Coleoptera were determined by the Imperial Institute, the Hymenoptera by Father O. Piel and Dr. A. von Schulthess, the Isoptera by Dr. T. E. Snyder.

COLEOPTERA

Chilocoristes pallidus Baly ?

Nam Cha Chuen, SW. of Nodoa, July 8, 1929; grove near Woh Hau Chuen, E. of Nodoa, July 2, 1929; without locality.

Chilocoristes funestus Ws.

Loh Ma Chuen, SW. of Nodoa, August 10, 1929.

¹ This expedition was made possible by funds contributed by the China Foundation for the Promotion of Education and Culture. (See *Ling. Sci. Jour.* 6(4):370; 9(1 & 2):159).

Hespera Pomasa Milk.

Lin Fa Ling (Mt.), near Nodoa, August 8, 1929; grove near Woh Hau Chuen, E. of Nodoa, July 3, 1929.

Lactica Perrauderi All.

Grove 1.5 mi. S. of Nodoa, June 27, 1929; S. of Nodoa, July 13, 1929.

Nisotra Bowringi Baly

Lin Fa Ling (Mt.), near Nodoa, August 8, 1929.

Hyphasoma fulvicornis Lac.

Woh Hau Chuen, E. of Nodoa, July 3, 1929; grove 2 mi. SW. of Nodoa, June 28, 1929; Beggar Village, SW. of Nodoa, July 16, 1929; grove near Beggar Village, SW. of Nodoa, July 9, 1929.

Chaetocnemia concinnipennis Baly

Grove near Woh Hau Chuen, E. of Nodoa, July 3, 1929.

HYMENOPTERA**Stilbum cyanurum** Forst.

SE. of Nodoa, August 19, 1929; Nodoa, June 24, 1929.

Eumenes affinissimus Sauss.

Grove near Hot Man Chuen, SW. of Nodoa, July 4, 1929.

Eumenes coarctatum L.

2 mi. S. of Nodoa, June 25, 1929.

Eumenes esuriens F.

2 mi. S. of Nodoa, June 25, 1929.

Eumenes pyriformis F.

Top of Li Fa Ling (Mt.), near Kuen Yam Ngam, vicinity of Nodoa, August 6, 1929; grove 2 mi. SW. of Nodoa, June 28, 1929; SE. of Nodoa, June 24, 1929; grove 1.5 mi. S. of Nodoa, June 27, 1929; NW. of Nodoa, August 27, 1929.

Pareumenes 4-spinosus Sauss.

Loh Ma Chuen, SW. of Nodoa, August 10, 1929; grove 2 mi. SW. of Nodoa, June 28, 1929.

Pareumenes sp.

2 mi. S. of Nodoa, June 25, 1929.

Rhynchium metallicum Sauss.

Grove near Woh Hau Chuen, E. of Nodoa, July 7, 1929; Man Fook Chuen, S. of Nodoa, July 19, 1929.

Rhynchium mellyi Sauss.

Man Fook Chuen, near Nodoa, July 4, 1929; Nodoa, June 24, 1929.

Rhynchium haemorrhoidale F. carnaticum Sauss.

2 mi. S. of Nodoa, June 25, 1929.

Rhynchium sp. nr. **carbonarium** Sauss.

Grove near Woh Hau Chuen, E. of Nodoa, July 2, 1929.

Odynerus diffinis Sauss.

Grove nr. Woh Hau Chuen, E. of Nodoa, July 3, 1929.

Odynerus fragilis Smith?

Two mi. S. of Nodoa, June 25, 1929.

Odynerus sp. near **guttatus** (Smith)

Grove nr. Hoi Man Chuen, SW. of Nodoa, July 4, 1929.

Odynerus sp. group **parietum**

Grove 1.5 mi. S. of Nodoa, July 13, 1929.

Icaria marginata (Lepel.)

Lin Fa Ling (Mt.) nr. Nodoa, July 21, 1929; grove 2 mi. SW. of Nodoa, June 28, 1929.

Icaria variegata (Smith)

Nam Cha Chuen, SW. of Nodoa, July 8, 1929; Lin Fa Ling (Mt.), Hau Ying Chuen, nr. Nodoa, July 29, 1929.

Icaria hongkongensis ?

Grove nr. Hoi Man Chuen, SW. of Nodoa, July 4, 1929.

Polybia orientalis Sauss.

Grove 1.5 mi. S. of Nodoa, July 13, 1929; Hainan, SE. of Nodoa, Aug. 19, 1929; Hainan, grove 1.5 mi. S. of Nodoa, July 13, 1929.

Parapolybia indica Sauss.

Top of Lin Fa Ling (Mt.) nr. Nodoa, Aug. 7, 1929; grove 2 mi. SW. of Nodoa, June 28, 1929; S. of Nodoa, July 29, 1929.

Stenogaster scitula Bingham

Top of Lin Fa Ling (Mt.) nr. Kuen Yam Ngam, vicinity of Nodoa, Aug. 6, 1929.

Sphex (=Chlorion) aurulentus F.

Man Fook Chuen, S. of Nodoa, July 19, 1929.

Sceliphron madraspatanum F.

Nam Cha Chuen, SW. of Nodoa, Aug. 9, 1929; N. of Nodoa, Aug. 15, 1929.

Sphex (=Ammophila) sp.

Man Fook Chuen, S. of Nodoa, July 19, 1929; grove 1.5 mi. S. of Nodoa, June 27 and July 13, 1929; grove 1.5 mi. S. of Nodoa, July 13, 1929.

Stizus sp.

Grove 1.5 mi. S. of Nodoa, July 13, 1929.

Ampulex (Rhinopsis) sp.

SE. of Nodoa, Aug. 28, 1929.

ISOPTERA**Termes (Cyclotermes) formosanus Shiraki**

Near Nodoa, July 10, 1929.

Macrotermes (M.) barneyi Light

Hung Mo Ling, May 10, 1929.

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海南島之鞘翅目膜翅目及等翅目昆蟲誌

賀輔民著

嶺南大學自然博物採集所

(摘要)

嶺南大學蒙中華教育文化基金董事會之資助，於民國十八年，在海南島探得之昆蟲多種，本文發表者，有鞘翅目七種，膜翅目廿六種，及等翅目二種。所述各種膜翅目昆蟲，以屬胡蜂科者為多。

Formosan Tree Sparrows (Fringillidae) Damage Brick Wall.—About two years ago the writer noticed a peculiar damage to several bricks in the west wall of the insectary. The outer surface of some of the bricks had been worn away until they had the appearance of sandstone which has the surface eroded by wind-driven sand. Obviously the damage could not have been caused in this manner. Observations were made from time to time to ascertain the cause, and finally it was observed that Formosan Tree Sparrows, *Passer montanus tarwanensis* Hartert, 1904, were the agents concerned. The sparrows have continued their activity, affecting a number of the bricks, one of which has by now been "eaten" entirely through. The

bricks, made locally, are fairly soft in texture and red in color. About a dozen and a half bricks in rows four to thirteen counting from the bottom have been affected. Fig. 1 shows the extent and nature of the damage. Apparently the birds are in search of grit.

It is interesting, in this connection, to consider the food of this species. The food of the young apparently consists largely of

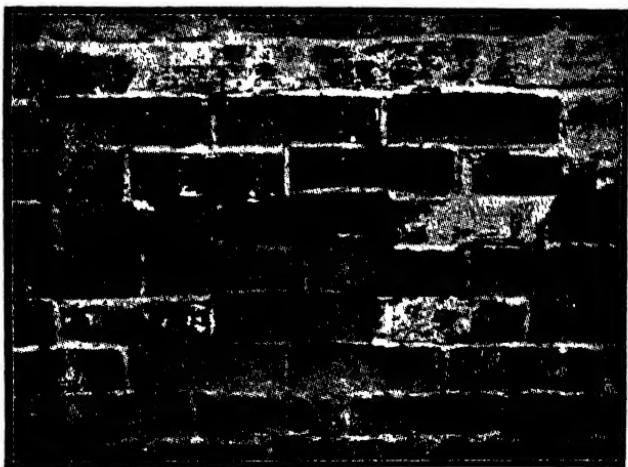


Fig. 1. A portion of the wall of a building showing how the brick have been "eaten" by the Formosan Tree Sparrow.

insects, while the adults feed on fruit and seeds, including grain, and are sometimes found in rice fields about harvest time. They are primarily birds of cities and villages and of dwellings. Houses, especially those with tiled roofs, are their favorite nesting places. Although this species has some of the bad traits of its near relative, the English Sparrow (*Passer domesticus* L.), it cannot be rated as an absolutely undesirable bird. The range of this species is Formosa and South China including Hainan Island. It breeds in Kwangtung from March to August.

The fact that these birds are used as food by the Cantonese serves to reduce their number somewhat. Village people cook the sparrows with congee which serves as food for children. The sparrows are also placed in wine and, after being allowed to stand for some months, the wine is used as a tonic. The birds are dressed and placed in rice wine without cooking. It is interesting in this connection to know that "Rice Birds" are not used in wine but are eaten very, very extensively in the Spring and again in the Fall, the price varying from sixty cents to as high as two dollars per dozen, depending upon the supply and demand, when served at

restaurants. The birds are netted in paddy fields. The "Rice Bird" is the Yellow-Breasted Bunting (*Emberiza aureola* Pallas, 1776) and belongs to the same family but a different subfamily from the Formosan Tree Sparrow. The former is also slightly larger than the latter. There is a widespread superstition concerning the origin of "Rice Birds", namely, that at certain times of the year fish are turned into birds. This belief comes from the fact that at certain seasons these birds are found in tremendous numbers in reeds in sandy areas along streams.

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述 麻 雀 之 毁 壞 磚 牆

賀 輔 民 著

嶺 南 大 學 自 然 博 物 採 集 所

(摘 要)

此節畧述麻雀爲害磚牆之情形。查其加害之法，乃逐日毀壞磚之一部，惟積日累月，以致波及全磚，如圖所示。至此鳥與禾花雀之食料及習性，亦有述及，蓋禾花雀係麻雀之相近屬類也。

GENERAL NOTES

Dr. N. Gist Gee

Word has recently been received of the untimely death of Dr. N. Gist Gee, well-known biologist, who spent about thirty years in China. Death occurred at his home in the United States. Dr. Gee was educated at Wofford College which also gave him the honorary LL.D. in 1926. Coming to China in 1901, Dr. Gee spent nearly twenty years at Soochow University. He then spent a year teaching in America and another year as Far Eastern representative of the Spencer Lens Company. During the period of 1922-32, he held several important positions on the staff of the Rockefeller Foundation in China, and in 1932 he became Vice-President of Yenching University. Dr. Gee was one of the earliest pioneer Western biologists in this country and a great deal of our present work can be traced in some way to his early influence. In his teaching work he encountered the difficulty, which still exists though in a lesser degree, of lack of suitable textbooks. This resulted in the publication in 1932 of a book entitled *Introduction to Biology*. In 1917 he published (with L. I. Moffett) a 221-page book on the birds of the Lower Yangtze Valley. Later he devoted more time to zoology and collected and sent away to specialists collections of animals of various groups. He later published lists of identifications of these animals and wrote a considerable number of scientific papers on insects, diatoms, crustaceans, earthworms, birds, etc. He was a frequent contributor to the pages of the *Lingnan Science Journal*. During the later years of his residence in this country, Dr. Gee devoted his research time to the study of sponges and published a considerable number of papers not only on the sponges of China but also on those of nearby countries. In 1921 Dr. Gee published a list of Chinese plant names of Kiangsu Province and, in 1936, a two-volume illustrated work, in Chinese, entitled "Birds of the Yangtze Valley".

Herbage Publication Series

Recently we have received copies of *Herbage Abstracts* and *Herbage Reviews*, of the Herbage Publication Series, published by the Imperial Bureau of Plant Genetics: Herbage Plants. Aberystwyth, Great Britain. The former was established in June 1931 and contains about 500 pages a volume, the latter with about 250 pages was begun in March 1933. Both are quarterly periodicals. The subscription price of *Herbage Abstracts* is 25 shillings per annum, of *Herbage Reviews*, 15 shillings. *Herbage Reviews* contains original articles in the fields of herbage and forage crops and in general grassland physiology. *Herbage Abstracts* is divided into the following sections: Herbage and Forage Plants with the subsections Crops in general, Grassland, meadows and pastures, Gramineae, Leguminosae, Miscellaneous fodders; Plant Biology, with Symbiosis, microbiology and inoculation, Biochemistry, Plant physiology, Poison plants, Embryology, Morphology and histology, Ecology, phytogeography and floras; Agronomy, with General agriculture, Plants in relation to soils, Erosion control, Seed testing and certification, Seed production, Seed harvesting, cleaning, storage and treatment, Sowing and seed mixtures, Harvesting, Fodder conservation, Crop and grassland management, Land reclamation, Fertilizers, Diseases and pests, Weeds and their control, Lawns; Books and Periodicals.

Projected Museum for Hong Kong

It is gratifying to learn that there has been started a movement for the establishment of a new museum in Hong Kong. A committee, formed to make suggestions in this connection, has submitted its report to the Colonial Secretary. In the opinion of the Committee, the museum should be confined in its scope to collections which pertain to China and Hong Kong. It is suggested that the museum should be established at least on a level with the standard which has been set in China, and it is pointed out that the Chinese government has spent large sums on the founding of museums and libraries in Nanking, Peiping, Shanghai and elsewhere. It is emphasized, and wisely, that the entire building if possible, and certainly that portion devoted to Natural History, should be air-conditioned. The report makes no special attempt to "sell" the museum idea (although the value of a museum to the colony is pointed out), apparently assuming that the government is fully cognizant of the value of such an institution. The emphasis is rather on the fact that the government has been derelict in its duty in not having already provided for such an institution. The Committee visualizes the museum as an educational center where various societies will meet, where public lectures will be given, in fact, a nucleus for the entertainment and enlightenment of the general public and a center of research, certain phases of which will have valuable, practical applications. The report represents clear thinking on the part of the Committee and might well be read with profit by various people who are, or should be, interested in scientific and educational progress in South China.

Bulletin of the Colonial Institute of Amsterdam

The first number of this interesting bulletin was published in November 1937, the second in February 1938. It is to appear in quarterly issues, the complete volume to contain at least 320 pages. The subscription price is fl. 7.50 or U. S. \$4.50 or 18/-."This Bulletin is published by the Colonial Institute of Amsterdam in collaboration with the Netherlands Pacific Institute which is affiliated with the National Council for the Netherlands and the Netherlands Indies of the Institute of Pacific Relations. It is written partly in Dutch and partly in English with a view to its double objective, viz., to disseminate knowledge concerning the Netherlands Indies and related subjects amongst foreign readers who are prevented by language difficulties from using Dutch sources, and to familiarize readers in the Netherlands and the Indies with current problems in the Pacific Area." Applications for exchange with other publications are welcomed and could be addressed to: The Editor of the Bulletin, Koloniaal Instituut, 63 Mauritskade, Amsterdam, (O), Holland.

Canal Rays

In Volume 16, No. 2 (p. 312), of this journal attention was called to a Special Number of *Current Science*. This actually constitutes a separate publication, rather than a special issue of that serial. A second Special Number has come to hand. This one is devoted to a discussion of Canal or Positive Rays. The publication opens with a short story of the life and work of Eugen Goldstein whose extensive investigations led to the identification of Positive Rays and ultimately to the discovery of isotopes. The main body of the present publication is devoted to articles by seven different authors, all of whom are outstanding specialists in their field. The topics discussed in these articles are as follows: Half a Century of Canal Ray Research; The Electromagnetic Analysis of Canal Rays; The Stark Effect of the Hydrogen Atom; On the Equilibrium of Neutral and Charged Particles in Canal Rays; The Applications of Canal Rays to Atomic Physics; High Speed Positive Rays of Hydrogen and Deuterium and Artificial Radioactivity.

BOOKS AND SPECIAL PUBLICATIONS

[GENERAL ENTOMOLOGY] 昆蟲學通論, translated by [MIU, TUAN-SHENG and YU, CHING-JANG] 錢端生, 于景讓 (In Chinese.) 424 pages and 52 pages of entomological literature, 313 figures, Commercial Press, China, 1937. \$2.50 Nat. cy.

This work is a translation of a Japanese work entitled 昆蟲學汎論 by 三宅愼力. The book is divided into 12 chapters, namely, the position of insects in the animal kingdom, anatomy and physiology of insects, development, insects in relation to plants, insects in relation to animals, insects in relation to men, insects in relation to locality, the study of entomology, methods for classification, classification of insects, methods for collecting, and the history of entomology. New material and information are frequently added by the translators especially on the subject of insect classification. Appended are 52 pages of entomological literature, added by the translators and considered by them as a keynote for students to find literature in the different fields of entomology.

Y. C. Ng

MARINE ALGAE OF THE NORTHEASTERN COAST OF NORTH AMERICA, by W. R. TAYLOR, x and 427 pages, 60 plates, containing 484 figures Univ. of Michigan Press, Ann. Arbor, 1937 \$5.00 U.S. cy.

The work is Volume 13 in the Univ. of Michigan Scientific Series. The author, Professor of Botany and Curator of Algae at the University of Michigan, has had, through his work in connection with the Marine Biological Laboratory at Woods Hole, Massachusetts, special opportunities for acquiring some first-hand knowledge of the algal flora of the area covered. A number of the species included were originally described by Dr. Chin-chih Jao, by whom most of the illustrations were prepared. The contents of the book are divided as follows: Preface (3 pages, chiefly acknowledgments); Introduction (23 pages, devoted to Area Surveyed, Geographical Distribution, Algal Habitats, Collection and Preservation, Historical Survey, Purposes and Limitations); Systematic List (9 pages, including about 300 species and numerous varieties and forms, under 165 genera, 58 families and 22 orders); Descriptive Catalogue (246 pages, with keys to the orders, families, genera and species, falling in their appropriate places) There is, for each category, a short description with references, and a key to the names in the next lower category excepting those of varieties and forms. The matter under each species comprises a reference to illustrations, if any, a description, distributional notes, references to literature, and, in some instances, a discussion of variability, relationships, etc. Following the main body of the text there is a bibliography, 25 pages in extent, designed "to give access to the floras of outlying and adjacent territories." The illustrations follow: 484 figures in 60 plates of line drawings, with the relevant explanatory matter, and page references to the descriptions in the text, placed opposite each plate. The index is arranged with each species name falling alphabetically in the main sequence, followed by a comma and the genus to which it belongs, instead of having the species arranged in subsidiary lists under the genera. The varieties and forms, however, are arranged in the usual way, in subsidiary lists under the species to which they are attached.

In explaining the methods followed, the author states that the work "has involved a redescription of most of the common species from American material, the incorporation in all specific descriptions of such data as could be secured from the literature, . . . The writer is fully aware of the likelihood of introducing errors with any such program of departure from established descriptions, but feels that an attempt must at once be made to obtain more adequate treatment of the characters of the American Algae." In the words of the author, "The book is planned to relieve the algal student from considering scattered sources of information in the older literature in

making routine determinations. It is not itself a final authority, for only the original specimens and descriptions underlying the various species names can so qualify. When a student finds agreement between a specimen and a description here included, the most that he can assume is that his plant conforms with a species concept adopted by the present author." And again, "The illustrations have been designed to afford a satisfactory idea of the aspect of all the commoner genera, and to elucidate the detailed structural features used to distinguish the genera and the species. When possible and advantageous the common species in each genus have all been illustrated."

F. A. McCCLURE

YEARBOOK OF AGRICULTURE 1937, foreword by HENRY A. WALLACE, 1497 pages, 334 fig., 107 tab., 8vo., cloth, United States Department of Agriculture, Washington, D. C., 1937. \$2.00 U. S. cy.

This volume constitutes the second and last of the two year-books on Genetics and Breeding, or Part II of Better Plants and Animals (See *Ling. Sci. Jour.* 16(2) .314 for review of Part I). The first one hundred and sixteen pages are given over to the title "The Year in Agriculture", which is the report of the Secretary of Agriculture to the President of the United States. This report gives in a condensed manner outstanding information concerning various phases of agriculture and closes with the following significant statement "Man's control of his own future may depend in the long run on whether his biological knowledge, which is constructive, can catch up with his knowledge of the physical sciences, which has taught him so much about how to destroy." The next fifty some pages are devoted to summary statements concerning various plants and animals as well as concerning heredity, vegetative reproduction, chromosomes, and finally an interesting chronology of genetics. The remainder of the book is devoted to full discussions of these topics. The plant and animal crops discussed include the following : tomatoes, peppers, eggplant, cucurbits, peas, beans, crucifers, root vegetables, salad crops, sweet corn, popcorn, potatoes, strawberry, bush fruits, deciduous fruits, citrus, legumes, grass, forest trees, goats, dogs, turkeys, ducks, fur animals and bees. Each chapter contains a bibliography. Some material, which was an interval part of this discussion of plants and animals, has been omitted from the yearbook but will be included in the Yearbook Separate. The many excellent illustration greatly enhance the value of this work

W. E. H

ABSTRACTS AND REVIEWS

An attempt is made to notice, abstract, or review articles and publications dealing with the biological and physical sciences in China. Articles in these fields which do not pertain specifically to China but contain information of interest and value to scientists and others in China are also included. Although this abstract service is maintained primarily for the benefit of people in China (where scientific literature is not plentiful) it is hoped that it will also be of service to those in other countries who are interested in following the progress of science in China.

Obviously we can make mention of or abstract only such literature as comes to the attention of the editors who, accordingly, will appreciate receiving literature for this purpose. Literature thus received is placed in Linkan University library.

Aiyar, S. Doraswami. The story of tea. *Madras Agri. Jour.* 25 (10) :300-308, 1937.—There is a brief history of the production and use of tea in China, Japan, Formosa, India, Ceylon, and Java, and of its introduction into western countries.

Alexander, Charles P. New or little-known Tipulidae from eastern Asia (Diptera). *Phil. Jour. Sci.* XXXIII, 61(2) :169-203, 2 pl., 1936; XXXIV, 62 (2) :143-181, 1 pt., 1937.—In part XXXIII, are discussed Tipulidae from the Khasi Hills, Assam, and from Sumatra; pt. XXXIV is devoted to specimens from southeastern Sumatra and from various parts of Java.

Alexander, Charles P. New or little-known Tipulidae from eastern Asia (Diptera), XXXV *Phil. Jour. Sci.* 63(4) :365-404, 3 pt., 1937.—The following species new to science are reported from Kiangsi. *Ptychoptera bellula*, *Dolichopeza (Smoropeza) paucisetosa*, *Helius (Helius) aciferus*, *Heratoma (Eriocera) quadrinotata*, *Teucholabis (Teucholabis) kiangsiensis*, *Gonomya (Lipophleps) inquisita*, *G. (L.) atrofasciata*, *Idiocera (Ptilostenodes) uniplagiata*. The new species, *Dolichopeza (Nesopeza) fabella*, *Limonia (Geranomyia) spectata*, *L. (G.) fremuda*, *L. (G.) subradiata*, *L. (G.) gracilispinosa*, *L. (G.) contorta*, *Ornithogrya (Ornithogrya) exasperata*, *Pseudolimnophila projecta*, *Gonomya (Lipophleps) subanalis*, *Cryptolabis (Baeoura) angustilobata*, *Molophilus inustus*, are from Kwangtung. *Limonia (Diveranomyia) pacifera* n. sp. is from Kwangtung and Kiangsi; *Limonia (Geranomyia) sparsiguttata* n. sp. from Fukien; *Helius (Helius) haemorrhoalis* n. sp. from Kiangsi and Fukien. In addition, 21 old species are recorded from southeastern China and 3 new ones are described from Java.

Anonymous. Contributions to the flora of Burma: XIII. *Bull. Misc. Inform. (Kew)* 1937 (8) :436-440, 1937.—*Isacum tetragonum* Roxb. is reported from China.

Arima, S. Banana fiber and manila hemp. (In Japanese with English title.) *Formosan Agric. Rev.* 370 :688-707, 1937

Arnold, E. H. Manchurian rice grass (*Zizania latifolia*). *New Zeal. Jour. Agric.* 55(3) :129-133, 3 figs., 1937.—A description of the grass, with an account of its occurrence and distribution in the northern Wairoa District of New Zealand.

Balthasar, Vladimír. Neue *Aphodius*-Arten aus dem palaarktischen Asien. Mit Uebersichten der Untergattungen *Iolonus* und *Calamosternus*. *Koleopt. Runds.* 19(3-4) :139-146, 1933.—*Aphodius procris* n. sp., in the new subgenus *Galestanus*, is described from Yunnan; *A. jacobsoni* Kosh. is from Mongolia; *A. (Calamosternus) desuetus* n. sp. from Yunnan and Chekiang.

Balthasar, Vladimír. Uebersicht der *Aphodius*-Arten der Untergattung *Acrosus* Muls mit Beschreibungen neuer Arten. *Koleopt. Runds.* 18(5) :200-208 4 text fig.; 18(6) :209-211, 3 text fig., 1932.—*Aphodius*

semiopacus Rtrr. is reported from Tibet, Chinese Turkestan, and China; *A. histrion* n. sp. and *A. Jedlickai* n. sp. are described from Szechwan; *A. Viturati* Rtrr. is recorded from China and Chinese Turkestan, with *contuber-nalis* n. sp. and *transmontanus* n. ssp. from Szechwan; *A. Klickai* n. sp. and *A. Obenbergeri* n. sp. are also from Szechwan.

Barrett, J. P. A review of some recent experimental work with derris and pyrethrum. *Canad. Ent.* 69(4):73-77, 1937

Beattie, J. H. Production of carrots. The culture of table beets. Production of spinach. Cauliflower and heading broccoli production. Production of eggplant. *U. S. Dept. of Agri. Leaflets* 125, 127, 128, 130 & 131, 1937.—These pamphlets, of four to eight pages each, discuss vegetables which are extensively grown in China. Information is given on such topics as follows: History and importance; climatic adaptation; soil, commercial fertilizer and manure; varieties and seed; planting and cultivation; thinning; diseases and insect enemies; harvesting and marketing; storage; yields and returns; uses. There are a few illustrations. W. E. H.

Belter, Georg. Berichtigung zu "Neues aus der *Melitaea didyma* Eyp.-Gruppe". *Ent. Runds.* 54(31):394-396, 1937.—Miscellaneous additional notes are given for the group.

Bénas. Inventaire de la faune ichthyologique. *Compt.-Rend. Trav., Inst. Rech. Agron. For., Indochine*, 2:437-440, 1937.—A list of fishes from Tonkin.

Bénas. Recherches concernant l'élevage de la carpe en étangs ou en bassins dans le nord de l'Indochine. *Compt.-Rend. Trav., Inst. Rech. Agron. For., Indochine*, 2:417-418, 7 tab., 1 graph, 1937.—Methods of management are discussed for obtaining maximum size and rapidity of growth.

Bénas. Recherches concernant l'élevage de la carpe en rizières dans le nord de l'Indochine. *Compt.-Rend. Trav., Inst. Rech. Agron. For., Indochine*, 2:429-436, 5 tab., 1937.—A method is described for growing carp in rice fields.

Bernhauer, Max. Neuheiten der palaarktischen Staphylinidenfauna. *Koleopt. Runds.*, I 21(1-2):39-48, 1935; II 21(3-4):123-129, 1935; III, 22(1-2):50-58, 1936.—Among the species treated are the following from the Chinese region: *Pinophilus rufipennis* Sharp from China, *P. formosae* n. sp. from Formosa, *P. picticornis sanguinipennis* n. ssp. from Tonkin, *P. punctatissimus* Sharp from China, *P. iaranus* Er from China, *P. Chapmani* n. sp. from Tonkin, *Atheta* (*Dialicta*) *subrufa* n. sp. from Szechwan, *Aleochara* (? *Coprochara*) *Bang-Haasi* n. sp. from Hongkong.

Bird, R. D. Insect photography. *Canadian Ent.* 69(7):167-170, 1937.—This article deals mostly with the equipment necessary for photographing insects but there is also a paragraph each on the historical aspect and on posing insects. A camera with double or triple extension bellows and ground glass is considered essential. An ideal size is 9 by 12 cm.; the lens should be a good anastigmat of F 4.5 aperture. A view camera with focusing back, as well as lens movement, is very good for close-up work. Illumination, types of film, filters and related subjects are also discussed. W. E. H.

Bolle, Friedrich. Eine *Rubus*-Sammlung aus Tonkin. *Notizblatt Bot. Gart. Mus. Berlin-Dahlem* 13(118):428-435, 1936.—The following are new: *Rubus tonkinensis* R. *pyrifolius* var. *densior*, *R. parvulaefolius*, *R. corticolar*, *R. intermittens*, and *R. polyadenus* var. *lugubris*. Distribution records are given for 13 other species and one variety.

Borchmann, Fr. Neue Alleculiden aus dem Deutschen Entomologischen Institut, Berlin-Dahlem. *Arb. morph. tar. Ent. Berlin-Dahlem* 4(3) :210-231, 2 fig., 1937.—Most of the species discussed are from Africa or South America. *Allecula (Upinella) ussuriensis* n. sp. is from Szechwan.

Boring, A. M., and Liu, C. C. Studies of the rainfrog, *Kaloula borealis*. III. An analysis of the skeletal features. *Peking Nat. Hist. Bull.* 12(1) :43-46, 1 pl., 1 tab., 1937.—This frog has many skeletal characters that resemble those of the toad. The family Microhyliidae is considered less specialized than the Ranidae.

Bourgogne, J. Description de deux Psychidae nouvelles de Cochinchine nuisibles au *Nipa fruticans* (Lep. Heteroceres). *Bull. Soc. Ent. France* 42(4) :55-62, 15 fig., 1937.—*Acanthopsyche (Cremastopsycy) nipae* n. sp. and *A (Metisa) griseoalba* n. sp. both attack *Nipa fruticans*. The life cycles of both species are described. Parasitism by *Apanteles* and by Cecidomyiids is of frequent occurrence. FROM REV. APPL. ENT.

Brandes, E. W., and Sartoris, G. B. Sugarcane: its origin and improvement. In U. S. Dept. Agri. Yearbook of Agriculture, 1936, p. 561-623, 14 fig., 5 tab., 1936.—This is a very interesting and informative article discussing many aspects of sugarcane production in many lands. W. E. H.

Breit, Josef. Beitrag zur Kenntnis des Carabiden-Genus *Pterostichus* Bon. *Koleopt. Rundsch.* 19(1-2) :67-70, 1933.—*Pterostichus (Melanius* Bon.) *nigrita* Fabr. *mukdenensis* n. ssp. is from Manchuria.

Brooks, Georges. La laque végétale d'Indochine. *La Nature* 3011 :359-363, 7 fig., 1937.—The important lac-producing plants are *Rhus vernicifera* D. C., *R. succedanea* L. fils, and *Melanorrhoea laccafera* P. The second is most important in Tonkin, the last in Cambodia and Cochinchina. There are brief notes on preparation of the latex, physical and chemical properties, composition and use of lac.

Bugnicourt. Sur quelques maladies de l'hevea et du theier. *Compte-Rendu des Travaux, Inst. Rech. Agron. For.*, Indochine, 1935-1936 (2) :161-174, 9 pl., 1937.—Diseases of rubber due to *Calonectria rigidiuscula* (Berk et Brmo), *Hypomyces ipomoeae* (Hals) Wr, *Gloeosporium alborubrum* Petch, and *Corticium salmonicolor* B. et Br are described. Tea diseases include those due to *Septobasidium*, *Massaria theicola* Petch, *Fomes lignosus* Kl., *Poria hypolateritia* Berk., *Ustulina marina* (Weh.) Von Weltstein, and *Rosellinia* sp. Photographs show typical diseased conditions and in each case recommendations are given for control.

Burkwall, Herman F. *Tinea Imbricata* in Hainan. *Chinese Med. Jour.* 51(1) :91, 1937.—Two cases of Tokelau ringworm are reported.

Burlison, W. L. Recent developments in the utilization of soybean oil in paint. *Univ. Ill. Agri. Sta. Circ.* 438, 8p., 1 fig., 1935.—An address, including a review of the investigations of the Illinois Experiment Station on soybean oil paint.

Burret, M. Beiträge zur Kenntnis der Tiliaceae VI. *Notizblatt Bot. Gard. Mus. Berlin-Dahlem* 13(119) :487-489, 1937.—The new species *Grewia Chuniana* is described from Hainan Island.

Burret, M. Palmae gerontogae V. *Notizblatt Bot. Gard. Mus. Berlin-Dahlem* 13(117) :135-200, 1936.—Among the new species described were the following from Asia: *Pinanga viridis* (from Kwangtung), *P. discolor* (from Kwangtung), and *P. macroclada* (from Yunnan). One new combination *Areca banaensis* (Mag.) Burret [*Pinanga bonaensis* Magalon] was included from Annam, and a single new name *Areca microspadix* Burret [*Pinanga nannospadix* Burret, non *Areca nannospadix*], from Annam.

F. P. METCALF

Burret, M. Palmae gerontogae VI. *Notizblatt Bot. Gart. Mus. Berlin-Dahlem* 13(118) : 317-348, 1936.—*Aranga banaensis* (Magalon) Burret is a new combination for *Pinnanga banaensis* Magalon; *N. nannospadix* Burret for *P. nannospadix* Burret. Both are from Annam.

Buwaldia, P. The Umbelliferae of the Netherlands Indies. *Blumea* 2(3) : 119-220, 6 fig., 1936.—A key is given to 22 genera and keys are given to the species of some of the genera. A number of widely distributed species including some cultivated forms are treated; several new species are described. Literature and distribution is indicated in an exhaustive manner. A number of the species discussed occur in China. W. E. H.

Callenfels, P. V. van S. The Melanesoid civilizations of eastern Asia. *Bull. Raffles Mus. Sci. B.*, No. 1.41-51, 1936.—A summary of important archaeological discoveries made in recent years, notably in French Indo-China, Sumatra, Java and the Malay Peninsula.

FROM AUSTRALIAN SCI. ABST.

Caresche, L. Deux Psychides nuisibles au palmier d'eau en Cochinchine. *Compt. Rend. Trar., Inst. Rech. Agron. For., Indochine*, 2 : 217-227, 6 pl., 1 tab., 1937.—There is a description of the various life stages and of the biology of *Cremastopsychus nipae* Bourg. and *Melisa griseoalba* Bourg., pests of palms in Cochinchina. The caterpillars are attacked by *Apanteles* spp. and by Cecidomyiidae.

Caresche, L. Première note sur les insectes nuisibles au kapokier dans le Sud-indochinois. *Compt.-Rend. Trar., Inst. Rech. Agron. For., Indochine*, 2 175-194, 8 pl., 1 tab., 1937.—The Curculionidae, the longicornes, and the Homoptera injuring kapok trees are treated. The first group is discussed most extensively with notes on biology and control of the pests.

Caresche, L. Le termite desctructeur de l'hévéa et du kapokier. *Compt. Rend. Trar., Inst. Rech. Agron. For., Indochine*, 2 195-212, 6 pl., 1937.—The morphology, biology, injury and control of *Coptotermes curvignathus* are discussed. Fumigation of trees is recommended for control.

Caresche, L., and Nguyen-huu-Hanh. Toxicité de l'anhydride sulfureux pour les termites. *Compt.-Rend. Trar., Inst. Rech. Agron. For., Indochine*, 2. 213-216, 1 fig., 1 tab., 1937.—When termites were exposed soldiers were killed in 6' 20" in an atmosphere containing 1% SO₂; workers were killed in 8' 25". With 7% SO₂, soldiers were killed in 1' 30"; workers in 1' 40". When the termites were protected by soil the rate of mortality was: soldiers 77' in 1% SO₂, workers, 114'; soldiers 24" in 7% SO₂, workers 49". Apparatus used in testing the gas is figured.

Carmin, J. Do fungi help to exterminate Red Scale in Palestine? *Hadar* 9(8) : 173-175, 7 fig., 1936.—The discussion is concerned with *Aspergillus da-pauperatus* Petch., 4. sp., *Cladosporium herbarum* and *Dematiu pullulans* (which may be only a form of the preceding species) in connection with their destruction of the Red Scale, *Tonidiella (Chrysomphalus) auranti* Mask., a species which is also destructive to Citrus in China. The first named fungus has been found attacking the Red Scale and no other insect in Palestine. The author found that fungi are valuable for destroying Red Scale in Palestine. Various factors still require further study especially the feasibility of spraying fruit with fungus spores. W. E. H.

Chang, Teh-ling. 草稿論. Notes on the egg production of *Anopheles hyrcanus* var. *sinensis* Wied. in Shanghai region. *Peking Nat. Hist. Bull.* 12(1) : 23-26, 2 tab., 1937.—Between May and September, 1935, 334 mosquitoes were caged and studied. Most of the mosquitoes laid only one batch of eggs, the average number of eggs per brood being 133.1.

Chen, Kia-ziang. Preliminary test on the use of tobacco powder for controlling rice insects. (In Chinese with English summary.) *Ent. & Phytopath.* 5(10):178-188, 1937.—In preliminary experiments against rice pests in China, waste tobacco dust was found to kill *Ninia atrovenosa* Leth., *Narinda aeneescens* Moore, and adults of *Chilo simplex* Btlr., *Schoenobius incertellus* Wlk., and other moths. The yield of rice is increased by using both the dust and stems of tobacco, but the former is the more effective insecticide.

FROM REV. APPL. ENT.

Chen, M. S., 陳夢士. An observation of the life history of *Ptychanatis argridis* Pallas in Canton. (In Chinese with English title.) *Prob. of Insects* 2(7):108-118, 4 figs., 6 tabs., 1937.—In the laboratory, *Ptychanatis argridis* Pallas requires from 27 to 261 days to complete its development. There are nine generations a year. They occur in the second ten days of February, first ten days of April, last ten days of May, June, July, August, first ten days of October, last ten days of October, and the first ten days of December. The generations of given months are usually found overlapping on account of the irregularity of the duration of the egg-laying period. The duration of the incubation period varies from 1 to 8 days. The average rate of hatching is 70.88%. The average duration of larval life is 12 days. There are four instars. The pupa stage lasts from 2 to 19 days. The longevity of the adult varies from 14 to 246 days. The duration of preoviposition period is 11 days on the average. The number of copulations of a given adult varies from 1 to 74, and a given copulation may last from 2 minutes to 3 hours. A female adult lays from 5 to 560 eggs. The food habit, and habits of mating, hatching, and molting are discussed; the different stages are figured.

Y. C. NG

Chen, M. S., 陳夢士. A study of *Saturnia pyretorum* West. (In Chinese with title also in English) *Prob. of Insects* (Canton) 2(1-2):4-13, 9 tabs.; 2(3):40-41, 2 tabs.; 2(4):54-59, 7 tabs.; 2(5):78-86, 3 figs., 1 tab., 2(6):93-106, 1 fig., 1937.—These are the concluding parts of an article already noted (*Ling. Sci. Jour.* 16(4):645). It is stated that the time of appearance of the adult varies according to the climatic conditions. In Formosa this period is about 70 days from early November to late January, with adults most numerous in mid December. In Hunan the adult appears over a period of about 60 days and is most numerous during the middle of January. At Canton the period is about 81 days, with the middle of February being the time when the specimens are most numerous. Males are more prevalent than females. Matting usually takes place about 12 hours after emergence and lasts from 5 to 13 (av. 9+) hours. Egg laying occurs from 1/2 to 9 1/2 (av. 3) hours after mating. The average number of layings is 3. The number of eggs laid varies from 64 to 974. The longevity of the unmated adult female is about 7 to 19 days, that of the male about 4 to 6 days. The mated female lives from about 3 to about 9 days, the mated male from 2 1/2 to 9 days. The incubation period is 19 to 42 days. About 5 to 24 hours after hatching, the larvae begin to eat. In Kwangtung there are 8 instars while in Formosa there are only 7. The average duration of the stadia are 7.4, 10.9, 7.11, 7.16, 7.15, 9.2, 12.3 days, but for the 8th stadium there must be some mistake in the figures because it is stated that the minimum time is 13.1 and the maximum time 9.23 days, while the average is 18.14 days—perhaps the 13.1 actually refers to the average. The length of larval life is 80 days. About 7 days are spent in making the cocoon. The prepupal stage is under 4 days; the pupal stage about 234 days. There is only one generation a year, about 367 days being required. For obtaining silk, only full grown live and healthy larvae should be selected. These are placed in clean, cold water, which drowns them and prevents them from spinning silk. The larvae are then dissected, the silk glands removed and soaked in a solution of acetic acid (1 pt. acetic acid to 60 pts. water). Removed from this solution, they are placed in another acetic acid solution, the strength of which depends upon the temperature at the time the silk is being prepared. After the glands

have been soaked in these solutions for some time, they are taken out and washed in clean water for 10 to 30 minutes. Finally the silk glands are tied on bamboo sticks and stretched out into long filaments. Natural enemies of the wild silkworm include insects, birds and some diseases. The insect group includes Hymenopterous egg-parasites; ants (*Crematogaster schinimeri* Forel., *Camponotus* sp., *Technomyrmex modigliani* Em. var. *angustior*); the wasp, *Eaochilum circumflexum* L. ?, parasitic on the caterpillar. Parasites of the pupa include *Theronia rufescens* (Morley), *Xanthopimpla japonica* Krieger, *Anthoccephalus* sp. The parasitic flies include *Tricolyga bombycum* Beck., *Tachina larvarum* Fab. and others. Some moths are also enemies. Eight or nine species of birds are mentioned as feeding on this species. A list of 37 references is given.

Y. W. DJOU

Chen, Sicien H. New and rare Chinese Coleoptera. *Sinensis* 6(6) : 768-781, 7 fig., 1935 [1936].—Eleven species (mostly new) are described in the families Elateridae, Cleridae, and Chrysomelidae. Most of the species are from Yunnan but some are from Kweichow and Kiangsi. Seven of the species are figured.

W. E. H.

Cheo, Ming-tsang, 周明將. A preliminary list of the insects and arachnids injurious to economic plants in China. *Peking Nat. Hist. Bull.* 11(2) : 110-127, 1936; 11(3) : 281-286; 11(4) : 417-432, 1937.—Pests are listed in alphabetical order under families. Plants attacked, distribution in China and in other parts of the world are indicated for each insect. In Lepidoptera 17 species of the family Notodontidae are included, 17 of Nymphalidae, 4 of Olethreutidae, 13 of Papilionidae, 12 of Pieridae, 1 of Plutellidae, 5 of Psychidae, 1 of Pterophoridae, 43 of Pyralidae, 11 of Saturniidae, 6 of Satyridae, 23 of Sphingidae, 1 of Tineidae, 15 of Tortricidae, 1 of Uranidae, 1 of Xyloryctidae, 4 of Zygaeidae. Orthoptera include 25 species in Acrididae, 14 in Gryllidae, 4 in Gryllotalpidae, 3 in Phasmidae, 10 in Tettigoniidae. Eight species of thrips are mentioned. (To be continued.)

Chin, Meng-hsiao, and Fung, To-chiao. 金孟宵, 楊鐸橋. Notes on some diseases and insect pests of Citrus fruit trees in Git-san, Canton. (In Chinese with title also in English.) *Prob. of Insects* 2(4) : 50-54, 1937.—The methods for control of the diseases and insect pests of Citrus fruit trees in Git-san, Canton, are briefly given with a special reference to the disease caused by *Bactrum Citri* (Hasse) and two beetles (*Podagricomela nigricollis* Chen and *Clera metallica* Chen). The disease and the above mentioned insects are described in great detail.

Y. C. Ng

Chopard, L. The Tridactylidae and Gryllidae of Ceylon. *Spolia Zeylanica* 20(1) : 9-87, 1 tab., 22 fig., 1936.—Ninety-eight species are discussed; 54 of these are known thus far only from Ceylon while about a dozen of them are widely distributed Asiatic species. There are keys to the subfamilies, genera and species. About two dozen species and at least one genus are described as new.

W. E. H.

Chu, C. V. 朱久望. Life history and control of a few important rice insects in Kwangtung Province. (In Chinese, with title also in English.) *Problem of Insects* (Canton) 1(9)[10] : 2-6; (11) : 6-8; (12) : 1-8, 7 fig., 1936.—Eight important rice insects are discussed in considerable detail, including the distribution in Kwangtung, description of the several stages, life history, and the methods of control. Six species of leaf-hoppers are briefly mentioned. Some of the figures on the amount of loss occasioned by rice insects are interesting, but from the experience of the reviewers not much reliance can be put on these figures. There are cases on record where the annual loss due to insects has been placed at impossible figures. At the present time we do not have reliable figures on agricultural production in this province, and still less reliable are the data on losses due to insects. However, we shall give some of the figures mentioned in the present paper

for what they may be worth. The loss due to rice borers in Kwangtung during 1935 was estimated at sixty million dollars. The borers concerned were *Schoenobius incertellus* Wlk. and *Chilo simplex* Btl. Both borers are said to have five generations in this province. Suggestions for control include winter plowing, cleaning culture, the use to tobacco powder in the seed-beds, removing infested parts of plants, cutting the rice close to the ground in harvesting, and rotation of crops. The method of using tobacco powder is to flood the field and spread tobacco dust on the water, which will kill the newly hatched caterpillars as they fall into the water. The most practical suggestion appears to be that of preparing the seed-beds in strips four feet wide, leaving a path between the strips along which the workers may pass as they hand pick the eggs and adults. The cutworm, *Leucania unipuncta* Haw., is said to appear only when the weather is hot and dry. The loss occasioned by this insect during 1935 was estimated at \$3,900,000 in one district and \$21,000 in another district, figures being available only for two districts. There are six generations, the adults appearing from late March to early October. Control methods consist of flooding, use of poison baits, herding ducks in the field, cutting the plants close to ground in harvesting. The Hesperiid Leaf-roller, *Parnara guttata* Brem., is said to have five generations. In 1936 the author estimated a loss of \$800,000 in two villages where something over 8,000 mow of rice were under cultivation. The caterpillars feed at night and one method of control is to flood the field at night, adding five catties of kerosene per acre. The leaves are then struck with bamboo sticks to knock the caterpillars into the water. The oily water must be removed the following morning. It is also suggested that the larvae may be killed by having workmen go through the fields and crush the larvae between two boards, one in each hand. When the larvae are in the third or fourth stage, they may be killed by dusting a mixture of lime and powdered tobacco on the rice in the evening, applying twenty five catties per acre. This should be done on two or three days with an interval of several days between applications. Selecting varieties of rice with tough leaves reduces the injury somewhat. The Chrysomelid, *Hispa armigera* Oliv., is said to have entirely destroyed three thousand acres of early crops in Poh-lo district in 1932, the total loss being more than \$24,000. There are six generations a year. Besides rice, this insect injures turnip, sugar-cane, various other crops and weeds. Besides clean culture, flooding is recommended as a method of control. The seed-beds should be flooded in the morning, the plants being nearly covered. A rope is then drawn across the seed-bed, bringing the larvae to the end of the seed-bed where they may be removed from the water and destroyed. The Grasshopper, *Oryza chinensis* Thunb., is a minor pest, but much of the damage done by cut-worms is blamed on this species especially in newspaper reports. This insect has two generations, appearing in early June and early September. Control measures consist of digging up the egg masses in the winter, herding ducks in the field when the nymphs appear, and collecting by the use of nets. The Fulgorid, *Surcharosydne procerus* Mat., and the Pentatomid, *Scotinophara lurida* Burm., are also discussed. The suggested control methods do not sound very practical and, since in the experience of the reviewers these two species are not of great importance in this province, the control methods will be omitted.

Y. W. DJOU & W. E. HOFFMANN

Chu, C. V., 朱久謨. The period of abundance and scarcity of rice borers in vicinity of Canton in 1936 (In Chinese with title also in English.) *Prob. of Insects* 2(6):90-93, 2 fig., 1 tab., 1937.—Based on the record of the rice borers attracted to a trap lantern, the period of abundance of different generations is from mid April to mid September. The methods used to attract the insects, kinds of insects attracted, and the occurrence of the adults of five generations are given. Y. C. NG

Chu, Joo-tso, and Hsia, Shen-hsiu. A list of the known Hymenopterous parasites of the European Corn Borer (*Pyrausta*

nubilalis Heubner). *Ent. & Phytopath.* 5(8) 136-147, 1937.—A list is given of over 70 species of parasites, showing their distribution and, in some cases, their other hosts and the parasites that attack them. It was compiled as a basis for an investigation of the possibility of the biological control of the moth in China, where it is a serious pest of maize, *Sorghum* and other plants.

FROM REV. APPL. ENT.

Clements, H. F. Studies in drought resistance of the soy bean. *Res. Studies State Coll. Wash.* 5(1) 1-21, 5 fig., 2 tab., 1937.—The development of a highly viscous protoplasm when grown under drought conditions seems to enable the plant to resist the evil effects to the drought. Though growth is reduced during drought no other outward appearances are manifested. Internally the hemi-cellulose content is much higher and starch is more abundant in drought-resisting plants. Photosynthesis does not appear to be retarded; nitrogen metabolism is maintained at a higher level. W.E.H.

Collins-Tenthorey, N. La métallurgie du fer dans l'Asie antérieure et ses rapports avec les migrations des peuples. *La Nature* 3009 277-280, 1 fig., 1937.—The author considers that the Sumerians first developed an iron-working industry and that through their migrations a knowledge of the use of iron was carried to central Asia and the Orient.

Consigny. Les pins d'Indochine. *Compt.-Rend. Trar.*, Inst. Rech. Agron. For., Indochine, 2 359-362, 7 pl., 1 tab., 1937.—There are descriptive notes on *Pinus Merkusii* and *P. Khasya*, an account of the resin content, and enlarged photographs showing wood structure.

Consigny. Regénération naturelle du possiblité en Indochine en forêts épaisse. *Compt. Rend. Trar.*, Inst. Rech. Agron. For., Indochine, 2:365-370, 4 pl., 1937.—Natural regeneration in dense forests was studied in 3 selected plots. Relation of number of plants per hectare to height of plants is plotted.

Cotton, R. T., and Good, N. E. Annotated list of the insects and mites associated with stored grain and cereal products, and of their arthropod parasites and predators. *U. S. Dept. of Agri. Misc. Pub.* 258, 81 p., 1937.—A good many of the forms discussed in this paper are present and very destructive in China, where very little is known about them and practically nothing has been done by way of control. This paper, therefore, is of considerable value to workers in China, who may wish to study these insects. It is estimated that the annual damage caused to stored grain and cereal products in the United States amounts to three hundred million dollars. There are no figures available for China, but the loss occasioned by these insects is certainly very great. Three hundred and thirty-six species are included. The information given includes common name, distribution, habitat, food habits, parasites and predators, relative importance. The forms are also given in a systematic list in which the more important synonyms are included. The literature cited includes 221 references. There is a very good index. W E. H.

Cresson, Ezra T. Jr. Descriptions of two new species of Indo-Australian Ephdydidae. *Trb. morph. tai Ent. Berlin Dahlem* 4(3) 205-207, 1937.—*Napaea formosana* n. sp. is described from Formosa.

Cushman, R. A. II Santer's Formosa collection: Ichneumonidæ. *Trb. morph. tai Ent. Berlin Dahlem* 4(4) 282-311, 17 fig., 1937.—Forty-five species of various genera are described. The following are new: *Nesostenodonius formosanus*, *Marsa formosana*, *Apophysis rufus*, *Syrites persimilis*, *Acerataspis formosana*, *Latibus tuberculatus*, *Anomalon frontalis*, *A. nigribasis*, *Heteropeltis prolongata*, *H. tarsale*, *Agyron trochanterale*, *Atrometus puerilis*, *Enicospilus concentricus*, *E. migrivialis*, *E. pallidistigma*, *E. nigristigma*, *E. sternopleps*, *E. sauteri*, *E. frater*, and *E. nigrimarginalis*.

Danser, B. H. Miscellaneous notes on Loranthaceae 9-15. *Blumea* 2(2) : 34-59, 2 fig., 1936.—This paper continues a discussion which appeared in *Recueil Trav. Bot. Neerl.* 31, p. 223-236 & 751-76, 1934. Plants from Borneo, Celebes, China, Lombok and the Philippines are treated. Several new species are described including *Taxillus sericus* from Yunnan Province. Léveillé's *Taxillus Cavaleriei* is redescribed. The two species of *Taxillus* just mentioned and 19 other species constitute material collected by George Forrest in Yunnan and adjacent regions.

W. E. H.

Das, S. M. Insects and disease. *Current Science* (India) 5(9) :503-505, 1937.—This article constitutes a very able review of medical entomology. The author mentions that more than two dozen common diseases, including the most widespread and fatal types, are transmitted by insects. He cites several cases of appalling mortality figures. Examples are as follows: The mean annual death roll in India for the period of 1920-29 due to the flea alone was 138,000; the death roll caused by the housefly during the same period was 800,000. More astounding still is the statement that more than 1,000,000 people die every year in India as a result of malaria. The author points out how much better it would be for the public, if municipalities would establish fly-free and mosquito-free zones instead of noise-free zones.

W. E. H.

Davis, D. Dwight. Courtship and mating behavior in snakes. *Zool. Ser. Field Mus. Nat. Hist.* 20(22) :257-290, 7 fig., 1936.

Dean, G. A., and Cotton, R. T. Flour mill insects and their control. *U. S. Dept. of Agri., Circ.* 390, p. 1-40, 28 fig., 1936 (rev. 1937).—Inasmuch as most of the insects treated in this paper are cosmopolitan in distribution and are found in China, much of the information is applicable to conditions in China, not so much in connection with mills but in connection with storage. During the present struggle, when it is imperative that insect damage to stored grain and grain products be reduced to a minimum and special efforts should be made to prevent insect damage, many helpful hints may be secured from this circular. The insects concerned, as well as the various processes of fumigation, are illustrated. The illustrations are of good quality and, apparently all of them are original.

W. E. H.

Dept. Agri., Kenya. Ramie, rhea-fibre or China grass (*Boehmeria nivea*). *E. Afr. Agric. Jour.* 2 :74-76, 1936.—The culture of this species, a Chinese plant, is discussed in relation to its culture in Kenya where the product is said to be superior to that produced elsewhere. The best method of propagation is by division of roots but other methods may be employed. A given planting should last 6 or 7 years. Close planting is advised in order that unbranched stems may be secured. The fiber should be separated by a decorticating machine or by hand; retting and sun-drying are harmful.

W. E. H.

Domke, W. Thymelaeaceen, neue Arten und Combinationen. *Notizblatt Bot. Gart. Mus. Berlin-Dahlem* 13(118) :386-389, 1936.—*Wikstroemia ericifolia* spec. nov. is from west Hupeh, *W. Huai* spec. nov. from Kansu.

Drake, C. J., and Poor, M. E. Some Tingidae (Hemiptera) from Oceania. *Iowa Sta. Coll. Jour. Sci.* 11(4) :397-404, 1937.—Of the thirty-two species treated seven are described as new. These are from Borneo, Formosa, Java, P. I., and Tasmania. Records for previously known species include China, Japan, New South Wales, Penang, and Straits Settlements. *Monanthia seorsa* n. sp and *Cystochila elongata* Dist. are recorded from Formosa; *Stephanitis nashi* Esaki & Takeya, the pear Tingid, is recorded from Canton and Tokyo.

W. E. H.

Drake, C. J., and M. E. Poor. Tingitidae from Malaysia and Madagascar (Hemiptera). *Phil. Jour. Sci.* 62(1):1-18, 1937.—Species from China, Borneo, Formosa, Java, Madagascar, Philippines, and Straits Settlements, including one new genus (*Perissonemia*) and sixteen new species, are treated.
W. E. H.

Ebeling, W. Effect of oil spray on California Red Scale at various stages of development. *Hilgardia* 10(4):95-125, 8 tab., 11 fig., 1936 (Rec'd Sept 1937).—The studies reported relate to *Aonidiella aurantii* (Mask.), a species which attacks citrus in China. The investigations showed that for a considerable period after spraying there was a marked inhibition of the settling of crawlers and that all immature stages were more easily killed by oil spray than were adults. Dusts are not practical for controlling the crawlers.
W. E. H.

Eidam, P., et al. Entomologische Sammelergebnisse der Deutschen Hindukusch Expedition 1935 der Deutschen Forschungsgemeinschaft. *Arb. morph. far. Ent. Berlin Dahlem* 4(3):177-191, 1 fig., 1937.—*Cantharis biocellata* Fairm. (Col., Cantharidae) is reported from Tibet. *Melasoma sativeti* ssp. *afghanica* n. ssp. (Chrysomelidae) is from Chinese Turkestan; species of *Myloeprops* (Curculionidae) from Szechwan.

Feng, C. L., 潘宗林 Cotton insects in Kwangsi Province (In Chinese with English title). *Insektol. Interesa* 2(7-9):73-74, 1936 [Rec'd Apr. 1937].—*Earias* sp. ?, *E. cupreorividis*, *Chlorita bukitata* Mats. *Sylepta derogata* Fab., and *Pectinophora gossypiella* Saund have been found as cotton pests in Kwangsi Province. Notes on the damage done and on the life history of some species are given. Appended is a list of Chinese species of *Earias*.
Y C Ng

Fortuyn, A. B. Droogleever, and Meng, T. H. Abnormalities in the shaker mouse. *Peking Nat. Hist. Bull.* 12(1):9-12, 1937.—Shaker mice appeared among descendants of hybrids between *Mus musculus* and *Mus wagneri* (or *bactrianus*) originally bought in the local market, Peiping. They were compared with shaker mice from Cold Spring Harbor, U. S. A. Both strains showed a high frequency of spontaneous leukemia in the liver, the American shakers also in the ovary. In some cases in both strains the corpora lutea were persistent.

Fortuyn-van Leyden, Mrs. C. E. Droogleever. Man-made deserts? *Peking Nat. Hist. Bull.* 12(1):27-36, 4 maps, 3 tab., 1937.—Arguments are presented to show that changing climate and not civilization is responsible for the great deserts. Climatic and soil conditions of NW China are especially discussed.

Fukuda, K. Researches concerning *Hispa similis* Uhmann (In Japanese). *Bull. Govt. Res. Inst. Formosa*, No. 130, 24 p., 1 pl., 1937.—*Hispa similis* Uhmann, all stages of which are described and which was formerly recorded as *H. armigera* Ol., is very injurious to rice in Formosa and also feeds on grasses, including *Zizania latifolia*, and occasionally on sugar cane. It has 3-5 generations a year, usually 3, and overwinters in the adult stage. The adults begin to attack rice early in March, but become more abundant later in the season and cause greater damage to the second crop than to the first. The female gnaws a slit in the lower surface of a leaf and lays an egg in it, usually covering it with excreta. Young leaves are preferred for oviposition, and a female lays 3-173 eggs in 7-48 days. The duration of the egg stage varies from 15 days in spring to 4 in summer, and the larval and pupal stages last 13-22 and 5-8 days, respectively. The larvae mine the leaves and pupate in their mines, but they migrate from an older leaf to a younger one 1-4 times. Pairing and oviposition take place about 5 and 9 days respectively, after emergence, and adults can survive 2-38 days without food. Those that emerge before early September may live as long as 87 days.

but do not overwinter; those that emerge after that time hibernate in the basal parts of grasses near rice fields, and feed occasionally. Burning grass in winter, hand collection of adults in spring, and contact sprays, such as nicotine sulphate or pyrethrum, are recommended for control. *Microbracon hispae* Vier. attacks 8.6-15.5% of the larvae. FROM REV. APPL. ENT.

Fulmek. Parasitensekten der beiden Kohlweisslingsarten. *Neuheiten Geb. Pflanzens.* 30(1) :152-155, 1937.—Lists with world distribution notes are given of the Diptera, Braconidae, Chalcididae, and Ichneumonidae parasitic on *Pieris brassicae* and *P. rapae* L.

Furtado, C. X. A commentary on the laws of botanical nomenclature. *Gard. Bull. Straits Settlements* 9(3) : 223-284, 1937.—The author discusses at some length the present Botanical Rules and gives a comprehensive and exhaustive criticism of some of the rules that were obscure, misleading and defective. The greatest fault is the equivocal use of the words Valid and Legitimate and their respective derivatives. Numerous critical remarks are added on other nomenclature problems and all proposals are illustrated with numerous examples. This commentary is worthy of considerable study, as the author clearly demonstrates the lack of uniformity in following the present rules and how arbitrary the present procedure is in many cases. His criticism is well taken as he makes definite proposals in most cases as to how this confusion can be eliminated in the future. F. P. METCALF

Gager, C. Stuart. Botanic gardens of the world, materials for a history. *Brooklyn Bot. Gard. Rec.* 26(3) 149-353, 1937.—The material is arranged by countries, in alphabetical order. Information is given, wherever possible, on date of establishment, directors, service to public, library and herbarium, plantations and publications. Chinese gardens at Amoy, Canton, Kiukiang, Nanking and Peiping are listed.

Georgi, C. D. V. A new method of harvesting, drying and sampling derris root. *Malayan Agri. Jour.* 25(10) :425-429, 1 tab., 1937.—Handling and drying of material were facilitated by chopping fresh roots in the field, instead of lifting whole roots. The author believes that such a procedure does not reduce toxic content.

Ghidini, G. M. L'accrescimento delle ghiandole della seta nel bomboce del gelso (*Bombyx mori* L.). *Boll. Soc. Ital. Biol. Sper.* 12 (10) :701-702 1937.

Goodrich, L. Carrington. Early notices of the peanut in China. *Monumenta Serica* 2(2) :405-509, 1937.—Translations are given of ten early references to the peanut in Chinese writings in the 17th century. The author agrees with Dr. Laufer that the peanut was introduced into Fukien in the 17th century, probably before 1608 and that its cultivation spread rapidly in the southeastern provinces.

Gore, Ramkrishna N. An improved feather-duster mosquito trap. *Rec. Malaria Surv. India* 7(2-3) :209-211, 6 fig., 1937.—This note consists of discussion and illustration of the use of an ordinary dark colored feather duster placed in a kerosene tin to trap mosquitoes. Methods of manipulating the trap and killing the catch are given in detail and shown by simple sketches. W. E. H.

Goulding, E. Textile fibres of vegetable origin: forty years of investigation at the Imperial Institute. *Bull. Imp. Inst.* 35 (1) :27-56, 1937.—Cotton, flax, jute, hemp, sisal and ramie as well as substitutes for these fibers and plants that can be used in admixture with them are discussed. Data on quality, quality as affected by method of preparation as well as by treatment after preparation, and factors (such as labour and machinery) affecting the economical production of textile fibers, are discussed. Most of the plants discussed are found in China. W. E. H.

Grabau, Amadeus W. Early Permian fossils of China. Pt. I, Early Permian brachiopods, pelecypods and gastropods of Kueichow. *Geol. Surv. China, Pal. Sinica*, ser. B. 8(3), 214 p., 11 pl., 3 text fig., 1934; Pt. II, Fauna of the Maping limestone of Kwangsi and Kueichow. *Ibid.* 8(4), 441 p., 31 pl., 1 text fig., 1936.—The first volume cited above describes the Early Permian fauna of the Kueichow area outside of the Maping limestone. It is derived from a compact and usually black limestone, a transgressive series over older formations. For the most part fossils are rare and widely scattered, and small forms predominate. Little of it is well preserved, and most of it appears to be exfoliated. The brachiopods show 103 forms, and of these 70 are determined specifically; 25 are new species. Of the 34 genera, one (*Polyella*) is new. Of pelecypods, there are 4 species (3 new); and of gastropods 10 (6 new), one of which is a very large *Omphalotrochus*.

In the second volume, which deals with the better preserved material in the Maping limestone faunas of Kwangsi and Kueichow, Grabau describes the following forms: corals, 4 new species; brachiopods, 126 (109 specifically named, and 67 new), in 33 genera (including *Nantanella* nov.); pelecypods, 13 (7 new species and the new genus *Palaeostrea*); gastropods, 15 (11 new species and the new genera *Paromphalus*, *Spiroraphella*, *Omphalonema*, and *Geron-ticeras*); and trilobites, 2 (1 new).

Heretofore the Maping limestone, about 170 meters thick, has been regarded as of Upper Permian age, but this erroneous correlation appears to have been due to unseen faulting and to faulty field observations along other lines. Recent field work has "demonstrated the true position of the Maping as underlying the Chihchia limestone," which is 145 meters thick. Beneath the Maping limestone there is a disconformity, followed by the Huanglung (—Weiningian) limestone (600m), of Moscovian age. The Swine limestone, the Chuanshan limestone, and the Taiyuan series are now seen to be of the same age as the Maping.

Since the brachiopods are the common fossils, with intercontinental distribution, they serve best for the correlation of the Maping limestone with the Permian of Russia. The two volumes under review describe 229 brachiopods, but as 43 are duplicates, this leaves 216 species or varieties represented in the Maping and other Early Permian limestones of China. Of these 98 are old species, of wide distribution, and 70 of them are in common with the Uralian of Russia. Or, to put it in another way, of the 209 named species or varieties in the Uralian, 70 occur in the Mapingian. This strong affinity between the brachiopods of Russia and China shows unmistakably that the Uralian and Maping faunas are of about the same age, i.e., of Early Permian, and in this conclusion the reviewer is pleased to agree with Professor Grabau.

CHARLES SCHUCHERT (FROM AMER. JOUR. SCI.)

Gressitt, J. Linsley. Soft-shelled turtle monstrosities from Hainan Island. *Peking Nat. Hist. Bull.* 11(4):413-415, 5 fig., 1937.—Two hump backed individuals of *Trionyx steindachneri* Siebenrock are described.

Guy, R. A., Chiang, C. C., Huang, H. H., and Yeh, K. S. Physical traits of Peiping children. *Chinese Med. Jour.* 52(4):507-518, 5 tab., 4 graphs, 1937.—We present here simple measurements of length and weight of a group of Chinese children (577 male and 425 female), of similar heredity and similar environment, including climate, food, housing, clothing and exposure to disease as they prevailed in Peiping at the time. Classifications according to sex and narrow age ranges are made. There is no implication either that the conditions are such as to allow the maximum growth inherent in their hereditary equipment, or that the measurements observed are optimal.

AUTHORS' SUMMARY

Hamada, Hideo. Physiologisch-systematische Untersuchungen über das Wachstum der Keimorgane von *Oryza sativa* L. *Publ. Bot. Inst.*

Sci. Dept. Kyoto Imp. Univ., No. 45 :260-309, 14 tab., 38 fig., 1937. (Reprinted from *Mem Coll. Sci. Kyoto Imp. Univ. Ser. B*, 12(3), article 14.)—Physiological and systematic research on the growth of the genetic organs of the rice plant.

Handel-Mazzetti, H. *Plantae novae Chingianae. Sinensis* 7(5) : 619-623, 1936.—The author describes five new species and one new variety from Kiangsi, representing material collected by R. C. Chung in 1928, namely, *Eriocaulon filiforme*, *Galeola kwangsiensis*, *Boea glutinosa*, *Trichosanthes Chingiana*, *Vernonia Chingiana*, and *Jasminum Seguinii* Lev. var. *latilobum*.

F. P. METCALF

Hao, K. S. Synopsis of Chinese *Populus*. *Contr. Inst. Bot. Nat. Acad. Peiping* 3(5) :221-241, 1935.—An excellent synopsis of the genus *Populus* for China. Twenty-four species are described in detail and a key is included for twenty-two, the remaining two not being seen by the author.

F. P. METCALF

Harms, H. *Araliaceae Petelotianeae Notizblatt Bot. Gart. Mus. Berlin Dahlem* 13(119) :448-455, 1937.—Twenty-two species are reported from Tonkin. The following new ones are described: *Schefflera brevipedicellata*, *S. chapana*, *S. choganhensis*, *S. myriocarpa*, *S. nitidifolia*, *S. trevesioides*, *Glibertia caloneura*, *G. Petelotii*, and *Brassaiopsis Petelotii*.

Hering, M. Drei neue Bohrfliegen-Metamorphosen aus der Mandchurien. *Arb. phys. angew. Ent. Berlin-Dahlem* 4(2) :110-115, 4 fig., 1937.—Life stages of the following Trypetidae (Dipt.) are described and figured: *Euphrante flavorufa* Hering from *Metaplexis japonica* (Tunb.), *Tephritis sonchini* sp. n. from *Sonchus alginosus* Bieb., and *Tephritis cometa cingulata* Hering from *Cirsium pendulum* Fischer.

Hill, A. F. The nomenclature of the cultivated sorghums. *Bot. Mus. Leaf Harvard Univ.* 4(10) :173-180, 1937.—The sorghums have been greatly confused taxonomically not only because of the numerous horticultural forms but also because they have been referred to three different genera, namely, *Audropogon*, *Holcus*, and *Sorghum*. The chief aim of the present paper is to assign names to the sorghums not treated by Bailey or Hitchcock in their manuals. The species listed are: *Sorghum halepense* (L.) Persoon, *S. sudanense* (Piper) Stapf, *S. virgatum* (Hack) Stapf, and *S. vulgare* Persoon, the last named with 12 varieties. Synonymy is indicated for the species and varieties and four references are cited. W. E. H.

Hoffmann, W. E. Notes on Citrus insects (In Chinese with English résumé). *Lang. Agri Jour* 2(1) :165-218, 12 fig., 1936.—This paper is a supplement to the discussion of Citrus insects included in a paper by Condit, Hoffmann and Wang on the culture of oranges near Swatow, China (*Lang. Sci. Jour.* 14(3) :541-2). The present paper discusses 38 species, most of which are pests but a few of which are beneficial. All but four species are figured. The life histories of *Thysanocysta citri* Maulik and a Flea Beetle are given in some detail and illustrated. The insects discussed represent seven orders and a large number of families. The author reports the introduction into Kwangtung by him of *Rodolia cardinalis* Mulsant for the control of *Icerya purchasi* Misk. Considerable biological information is given concerning a White Fly, *Heniochanthus incertus* Silv., which has not been previously recorded from China. In addition to attacking various kinds of Citrus, this species also attacks *Mitchelia champaca* L. All of the stages, except the adult, are figured. The Cultured Red Ant of Citrus, *Oecophylla smaragdina* F., a species whose true economic status has never been determined, is discussed at some length. So far as present knowledge goes, this species appears to do more harm than good.

Hoffmann, W. E. Further notes on Citrus insects in Kwangtung. (In Chinese and English.) *Ling. Agri. Jour.* 2(2, 3 & 4):378-396, 3 figs., 1936[1937].—This paper continues the account of Citrus insects noted above. Three species are discussed in detail and figured. These are *Papilio demoleus* L., *P. polytes* L. and a Lycaenid, probably *Chilades laus* Cram. Both Papilos feed on various species of Citrus and on Wong Pei, *Clausena lanstro* (Lour.) Skeels. The second species is not quite such a general feeder as the first named, but is more abundant than the first. Eggs of *P. demoleus* laid during the first half of November hatched in 5-7 days, and larval development required from 26-30 days. The pupal stage required from 17-22 days. *P. polytes* was not reared in detail, but the life history appeared to be very similar to that of *P. demoleus*. Detailed descriptions and figures of all the stages make it possible to differentiate between these two species. The Lycaenid larvae attack lemon, several unidentified cultivated varieties of Citrus and *Serenoa burifolia* Tem. During October and November, 1936, larval development required about two weeks, the pupal period about one week. The life cycle appeared to be completed in about one month.

Hoffmann, W. E. Notes on Kwai Fa Shum (*Lethocerus indicus* Lep. & Serv.), an insect of economic importance (In Chinese and English.) *Ling. Agri. Jour.* 1(4):167-174, 7 figs., 1935.—Many thousands of dollars are saved every year for the people of Kwangtung Province because of the fact that the giant water bug, *Lethocerus indicus* Lep. & Serv., is used as food by the people of this province. A more effective way to control this insect, however, would be the collection of its eggs in April or May, and this practice is recommended to those engaged in the rearing of fresh-water fishes in the province. All the stages of this insect are described and figured. The egg masses consist of about 150 eggs laid in about 12 vertical rows and stuck on to stems with a gelatinous material. The incubation period is about a week or ten days. The approximate time spent in each nymphal stage is 8, 6, 7, 11, and 21 days. About two months are required for development from egg to adult.

Hoffmann, W. E., and Fuson, Ben. Notes on three widely distributed insect pests of vegetables and their occurrence at Canton. (In Chinese with English résumé.) *Ling. Agri. Jour.* 2(1):219-236, 10 figs., 1936.—*Plutella maculipennis* Curtis, *Cylas formicarius* L. and *Phyllotreta vittata* Fabr., the first two not previously recorded for Kwangtung Province are discussed and figured. *P. maculipennis* seriously attacks a number of cultivated crucifers in Canton where the life history has been worked out. In June the migration period is 3-4 days, the larval period 9-13, and the pupal period 4-5 days. All of the stages are figured. *C. formicarius* is a serious pest on sweet potatoes in Kwangtung Province. *P. vittata* is very serious on species of *Brassica* and *Raphanus*. It also feeds on *Phaseolus lunatus* L. and *Ligna sesquipedalis* L. Control measures, largely taken from literature, are given for all three species.

Hone, H. Meine Studienreise nach dem Tsinling und was daraus wurde. *Ent. Rundsch.* 54(33):413-419, 1937.—Notes from Shantung, Chufu, and Shensi are given.

Hori, Hiroshi. Studies on the Japanese Pterophoridae (III) on the genus *Trichoptilus*, and notes on *Platyptilia rhododactyla* and *Oidaematophorus lithodactylus*. (In Japanese with English resume.) *Rulteno Scienza* (Fukuoka, Japan) 7(1):73-90, 2 pi., 1936.—The species discussed are *Trichoptilus defectalis* Wlk. (Formosa, Marianne and Palau Is.), *T. wahlbergi* (Zeller) (Manchuria, Formosa, Japan), and *T. esakii* n. sp. (Ryukyu Is.). There are three pages of bibliography.

W. E. H.

Horn, Walther. Neues über *Collyris*-Formen (Cicind.). *Koleopt. Rundsch.*, Wien, 21(1-2):49-54, 1935.—*Collyris Sauteri grosse-punctata* n. sp.

and *C. aureofusca grandi-radosa* n. ssp. are described from Tonkin; *C. aureofusca grandi-subtilis* n. ssp. from Hong Kong; *C. insignis unicolor* n. ssp. and *C. in. semi-aenescens* n. ssp. from Laos.

Hou, H. C. Diet and health in China. *Chinese Med. Jour.* 52(3) : 413-420, 2 tab., 1937.—Nutrition of the masses of Chinese people is inadequate and deficiency diseases are common. The deficiency is usually in animal proteins, fats, calcium, and vitamins—A and D in North China and A and B in South China. Inadequacy is due in part to low economic level of the people and in part to ignorance of real food values. Tables, listing foods usually available in China, show minimum dietary requirements of average adults, children, and women during pregnancy.

Hsieh, T. Y., Chang, Shih-lu, and Yang, Chi-shih. Typhus fever in Chingsna. *Chinese Med. Jour.* 52(3) : 383-388, 1937.—A series of 14 cases of typhus fever is reported; 10 of them were indigenous to Changsha, one was from Changtch. The general course of the disease was mild, and the rash was atypical. It is suggested that typhus fever in Hunan may represent a different strain of the virus from that seen in North China.

AUTHORS' SUMMARY

Hsu, Yin-chi. 徐隆祺. The mayflies of China (order Ephemeroptera). *Peking Nat. Hist. Bull.* 11 (2) : 129-148, 1936, 11 (3) : 287-296, 11 (4) : 433-440, 12 (1) : 53-56, 12 (2) : 123-126, 43 test fig., 1 tab., 1937.—This is a monographic study of the Chinese species of mayflies. Taxonomic characters are briefly reviewed. There are keys to families, subfamilies, genera, and species, and detailed descriptions of each genus and species. New species described are the following: *Polymitarcys nanchangii*, *Ephemera shengmu*, *F. wuchowensis*, *E. yaoshani*, *Polymanthodes kwangsiensis*. (To be continued)

Hu, Hsen-Hsu. Amesiadendron, a new genus of Sapindaceae from southern China. *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(5) : 207-210, 1936.—The genus is based on Merrill's *Paranephelium chinense* (Ling Sci. Jour. 14, 30, 1930) discovered in Hainan and Kweichow. The new genus is distinguished from *Paranephelium* by the scales being entirely free from the petals and by the smooth and not tuberculate ovary. The fruit is dehiscent into two instead of three valves. From *Pavieasia* it differs in being polygamous-monoecious and in having a turbinate pistil with style shorter than the ovary. The genus is named in honor of Prof. Oakes Ames, former supervisor of the Arnold Arboretum. The new combination *A. chinense* (Merrill) Hu is made and additional descriptions of the ♂ and ♀ flowers are given. F. P. METCALF

Hu, Hsen-Hsu. Norulæ systematicæ ad florem Simensiæ VII. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(5) : 211-218, 1936.—The author describes five new species and one new variety: *Humulus gunnianensis* (Tsai 56272, type, Yunnan), *Guruga gunnianensis* (Tsai 53278, type, Yunnan), *Cocuria kweichowensis* (Tsiang 8062, type, Kweichow (—original spelling *kweichowensis*, manifestly an error)), *Microtiopsis illicifolia* Koiz. var. *gunnianensis* (Tsai 51664, type, 51738 and 55986, paratypes, Yunnan), *Paradombeya szechuenica* (Yu 4152, type, Szechwan) and *Sarcopyramis Dicella* (Tsai 58729, type, Yunnan). F. P. METCALF

Hu, Hsen-Hsu. *Sinofolustonia*, a new genus of Boraginaceæ from Szechuan. (With Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(5) : 201-205, 1936.—The new genus is represented by the new species, *S. plantaginea*, of which F. T. Wang 20517 is the type. This genus is most closely allied to *Craniospermum*, a small genus of the Altai-Baical region of Siberia, but has fugal appendages for the corolla, angular, pentahedral, hispidulous nutlets, with a cupulate crest arising from the convex dorsum side. Unfortunately the species is not illustrated. F. P. METCALF

Hu, H. H. 胡先驥. Chronicle of the biological sciences in China. *T'ien Hsia Monthly* 4 (5). 484-497, 1937.—Although considerable interesting information is given this article falls short of what one expects. In reality the subject should have been more adequately treated or else have been given a different title. The author makes the statement that "Every one of the twenty-three colleges and universities in China has a well staffed department of biology that is carrying on research work in various fields" yet fails to make any mention whatever of the work done in a number of the more important of such institutions. Likewise certain branches of biological science are omitted entirely while others are discussed in such a superficial manner as to give the wrong impression. In fact the reviewer's attention was called to this article by having read a review of it written by one who had obviously gained from the article a false idea of the present status of biological work in China. One or two examples may be given. Parasitology is scarcely mentioned, while the discussion of ichthyology omits mention of the outstanding Chinese ichthyologists and their work. In entomology eight entomologists are mentioned but half of these are relatively unknown in entomological circles in China. A number of outstanding Chinese entomologists and entomological publications are not mentioned at all although certain unpublished work is referred to. Three insect family names are misspelled and to one family the wrong common name is assigned. The vast field of economic entomology is referred to by name only. W. E. H.

Hu, Stephen M. K., 胡梅基. Experiments on repeated infections of filarial larvae in *Culex pipiens* var *pallens* Coq. *Peking Nat. Hist. Bull.* 12(1):13-18, 2 tab., 1937.—It was found that some of the mosquitoes were susceptible to the infection at the first blood feed but not at the second, and vice versa. In some mosquitoes harboring both broods of filarial larvae it was found that the same mosquito might be highly susceptible to the infection on one occasion and less so on another, as there was considerable difference in the number of the parasites in each brood. H. T. CHEN

Hu, Stephen M. K., Wong, Helena, and Li, Bi Cu. A brief survey of filariasis in Foochow and Futsing regions, south China. *Chinese Med. Jour.* 52(4):571-578, 1 fig., 1 tab., 1937.—During 1936, from the months of June to November, the blood of 500 persons in Foochow was examined for microfilariae. The total number positive for them amounted to 28 or 5.6%. The positive cases included patients from Foochow and the central and northern parts of Fukien, along the sea coast as well as inland. Only one positive case, a merchant, reported that he had been outside of the province. Of the 28 positive cases, four were found to be infected with *M. malayi*. In the same year, 266 persons from Futsing city were examined for microfilariae. 38 of them were found to be infected with *M. bancrofti*. *Culex fatigans* were found to harbor filarial larvae. At Lungtien, near Futsing, three out of 40 persons examined were found infected with *M. bancrofti*. H. T. CHEN

Huard, P., Do-Xuan-Hop, and Hach. Données pondérales et métriques concernant 39.352 nouveau-nés des différentes races de l'Indochine. *Bull. Soc. Med.-Chir. l'Indochine* 15(7):785-803, 12 graphs, 3 tab., 1937. [The same paper, without graphs, appeared in *Bull. Soc. Med.-Chir. l'Indochine* 15(6):622-631, 1937.]—In general new-born children of Tonkin and Annam are smaller than those of Cochin-China and Cambodia. Diagrams are given showing the total body weight of normal and still born infants and their body measurements. A study of the weights of the viscera was made on 25 still-born foetuses of both sexes, from Hanoi.

Hwang, C. L., 黃其林. The known butterflies of Nanking. *Agri Res.*, Nat. Central Univ., Nanking, 3(2):95-173, 6 fig., 6 pl., 1936 (rec'd May 1937).—Prefaced by a discussion of the different systems of classification for Lepidoptera, especially as regards the terminology of wing venation, the

author lists 11 species in Papilionidae, 9 in Pieridae, 1 in Danaidae, 6 in Satyridae, 14 in Nymphalidae, 8 in Lycaenidae, 5 in Hesperiidae. There is a key to the seven families and to the genera and species of each of the seven families. The adults are described and figured and the time of appearance noted.

W. E. H.

Jedlicka, Arnost. *Bembidion (Daniela) sutschanense* sp. n. *Casopis Cs. Spol. Ent.* 33(4):163, 1936.—From Ussuri-Szechwan.

Jedlicka, Arnost. Dva nové druhy Carabidu z Filipin (Carab.). *Casopis Cs. Spol. Ent.* 33(1-2):17, 1936.—*Platynus (Lymodromius) asper* sp. n. is from Yunnan.

Jedlicka, Arnost. Über palaearctische Dolichus-Arten. *Casopis Cs. Spol. Ent.* 33(1-2):31-32, 1936.—Brief descriptive notes are given in the form of a key. *D. rufithorax* sp. n., *D. r. ab. pictus* ab. n., *D. viduus* ab. *triangularis* ab. n., *D. v. ab. brunneipennis* ab. n., *D. phaeopus* ab. *limbatus* ab. n. are new forms from China. *D. coreicus* sp. n. is from Korea.

Jedlicka, Arnost. *Pterostichus (?Badistrinus) Arrowi* sp. n. *Casopis Cs. Spol. Ent.* 33(3):133, 1936.—From Yunnan.

Jedlicka, Arnost. *Pterostichus tachongi* sp. n. *Casopis Cs. Spol. Ent.* 33(4):156, 1936.—The species is from Kansu.

Jones, J. W. Improvement in rice. In U. S. Dept. Agri. Yearbook of Agriculture, 1936, p. 415-454, 14 fig., 3 tab., 1936.—The subject is discussed by countries. The reference to China proper (p 436) is devoted to an account of the work being done by the National Research Bureau of Agriculture at Nanking.

W. E. H.

Jordan, Karl. A new flea from China. *Novitat. Zoolog.* (Tring, London) 40(2):295-296, 2 text fig., 1937.—*Nosopsyllus nicanus* was collected from rats (mostly *R. r. norvegicus*) at Iungyen, South Fukien. It is related to *N. punjabensis* J. & R. and *N. fasciatus* Bosc.

Joyeux, M. L'évolution de la ville de Hanoi. Triptyque d'hygiène. *Bull. Soc. Med.-Chir. l'Indochine* 15(6):668-692, 1937.

Kamakura, T. On the cassava industry in Formosa. (In Japanese with English title.) *Formosan Agri. Rev.* 370:711-749, 19 tab., 1937.

Kéler, S. Über einige neue und interessantere Mallophagen des Deutschen Entomologischen Instituts in Berlin-Dahlem. *Arb. morph. tax. Ent. Berlin-Dahlem* 4(4):312-324, 3 fig., 1937.—*Anaticola zunkeri* and *Bovicola sachtlebeni* n. spp. are described from Formosa.

Kitagawa, Masao. Contributio ad cognitionem floricet Manshu-riceae VII. *Bot. Mag. Tokyo* 50:73-79, 5 fig.; VIII, 135-142, 4 fig., 1936.—In these numbers of the series are described the following new species and varieties: *Pleuropteropyrum microcarpum*, *P. mollifolium*, *Polygonum stans*, *Arenaria tonsa*, *Anemone stolonifera* Maxim. var. *quelpartensis* Nakai & Kitagawa, *Sanquisorbla rectispica*, with its variety *longifila*, *Primula tyoschniana* Nakai apud Kitagawa, *P. hondoensis* Nakai & Kitagawa, *P. yesomontana* Nakai & Kitagawa, with its variety *nudiascula* Nakai & Kitagawa. A single new name is proposed *Primula Loeseneri* Kitagawa [P. *Pariuna* Gilg, non O. Kuntze.]

F. P. METCALF

Koidzumi, Hideo. Taraxacum novum Orientali-Asiaticum. IV. *Bot. Mag. Tokyo* 50:86-93; V. ibid. 50:142-147, 1936.—In this part of the series the author describes the following new species and varieties. *Taraxacum Taqueti* (Korea), with its var. *pinnatifiditum* (Korea), *T. glabrisquamum* Nakai apud Koidzumi (Korea), *T. paraceratophorum* Nakai apud Koidzumi (Korea), *T.*

dageletense Nakai apud Koidzumi (Korea), *T. mandshuricum* Nakai apud Koidzumi (Manchuria), *T. heterolepis* Nakai and Koidzumi apud Kitagawa (Manchuria), *T. glaucauthum* Nakai apud Koidzumi (Kansu, China), *T. kansuense* Nakai apud Koidzumi (Kansu, China), *T. pseudodissectum* Nakai & Koidzumi apud Koidzumi (Nanking, China), *T. argute-denticulatum* Nakai apud Koidzumi (Hang chou, China), *T. Hondae* Nakai & Koidzumi apud Koidzumi (Hang-chou, China), *T. anadyrense* Nakai & Koidzumi, (Siberia), *T. neglectum* Nakai & Koidzumi (Kamtschatka), and *T. platycarpum* Dahlst. var. *genuinum* Koidzumi and var. *ecorniculatum* Koidzumi. Two new combinations are also included *T. platycarpum* Dahlst. var. *Sendaicum* (Kitagawa) Koidzumi [*T. sendaicum* Kitamura] and *T. p.* var. *variable* (Kitamura) Koidzumi [*T. variable* Kitamura].

F. P. METCALF

Kojo, K. Influence of cutting roots on the flower bud formation in sweet potato. (In Japanese with English title.) *Formosan Agric. Rep.* 370 :750-754, 1 tab., 1937.

Kôno, Hiromichi. Die Cerambyciden aus den Kurilen (Col.) (Achter Beitrag zur Kenntnis der Käferfauna der Kurilen). *Insecta Matsum.* 11(1-2) :28-35, 1936.—Of the 28 species the following are from Korea: *Distenia gracilis* (Blessig), *Rhagium inquisitor* (L.), *Eodinus interrogatorius* (L.), *Leptura (Leptura) scotodes* Bates, L. (L.) *succedanea* Lewis, *Strangalia (S.) aethiops* (Poda), *S. (S.) arcuata* Panzer, *Atemum punctulatum* Blessig, *Criocephalus rusticus* (L.), and *Lygapathia davurica* Ganglbauer. *Lecanum rufum* Thomson and *Plectrura metallica* Bates occur in Formosa.

W. E. H.

Kôno, Hiromichi. Die Clavicornien aus den Kurilen (Siebenter Beitrag zur Kenntnis der Käferfauna der Kurilen). *Insecta Matsum.* 10(4) :148-153, 1936.—Seventeen species (one new) in several families are listed. The Nutiduid *Ostoma colon* (L.) also occurs in Korea while the Coccinellids *Ithona mirabilis* (Motsch.), *Coccinella septempunctata bruckii* Muls., and *Propylaea japonica* Thunb. occur in China.

W. E. H.

Kôno, Hiromichi. Die Heteromeren aus den Kurilen II (Sechster Beitrag zur Kenntnis der Käferfauna der Kurilen). *Insecta Matsum.* 10(3) :104-106, 1936.—Thirteen species representing six families are included. At least one of these, the Lagrid *Lagria nigricollis* Hope, occurs in China.

W. E. H.

Kosminskij, P. A., and Mordovkina, N. A. On the question of the inheritance of yellow colour in cocoons in *Bombyx mori* L. *Comptes Rendus Acad. Sci. URSS* (new series) 14(3) :133-134, 1937.—Yellow colour of the cocoon is determined by two pigments, xanthophyll and carotin, the least amount of carotin being observed in the case of the typical yellow colour, more in the case of flesh colour, and most in the case of rose colour. There is only one gene of yellow cocoon colour. The nature of the colour depends upon time and intensity of penetration of the pigment into the glands; is determined by the influence of modifiers and external conditions, chiefly temperature.

W. E. H.

Kreis, Hans A. Beiträge zur Kenntnis parasitischer Nematoden. *Verh. Naturf. Ges. Basel* 47 (1935-36) :60-66, 2 text fig., 1936.—The morphology, biology and pathology of *Dirofilaria immitis* (Leidy) are discussed.

Ku, Chang-tung. 麥昌樸. On a new trematode parasite from the peking duck. *Peking Nat. Hist. Bull.* 12(1) :39-42, 1 fig., 1937.—*Echinostoma pekinensis* n. sp. was described from the small intestine of peking ducks, *Anas domestica* var. *pekinensis*. It was compared with several closely related species.

H. T. CHEN

Ku, Yuang. 蘇立. A few problems on the insecticides in China. (In Chinese with title also in English) *Jour. Agri. Assoc. China*, No. 159: 216-221, 1937.—Cultivation of derris, a further study of Pa Tau [probably *Croton tiglium* L.], utilization of zinc compounds as insecticides, and establishment of factories for manufacturing agricultural fungicides and insecticides are the important problems in connection with insecticides in China.

H. W. TSANG

Kurenkov, A. I. Fundamental regularities in the distribution of the dendropilous lepidopterous fauna (Macrolepidoptera) in the Ussuri Province. *Compt. Rend. (Doklady) Acad. Sci. URSS*, 16(3): 173-176, 1937.—The fauna is divided into Palaearctic species and East-Asiatic one. The significance of the distribution of these groups of insects is discussed.

Kuwayama, Satoru. Materials for the study of the neuropteroid fauna of the Kurile Islands I. *Insecta Matsum.* 10(3): 107-110, 1936.—Ten species in five families of Neuroptera and one species of Mecoptera are treated. The Myrmeleontid *Myrmeleon formicarius* L., a Chinese species, is one of the species listed.

W. E. H.

Lai, K. C. 黎國廉. An estimation of the Brix cane infested by *Oregma lanigera* Zehntner. (In Chinese with title also in English) *Prob. of Insects* 2(4): 60, 1 fig., 2 tab., 1937.—The presence of the Brix of cane is inversely proportional to the degree of infestation caused by *Oregma lanigera* Zehntner.

Y. C. NG

Lai, K. C. 黎國廉. Notes on three species of earwig (*Proreus simulans* Stål, *Euborellia stali* (Dohrn) and *Euborellia annulipes* (Lucas)) in sugar-cane field of the Kwangtung delta. (In Chinese with English title) *Prob. of Insects* 2(7): 119-121, 1 fig., 1937.—Three species (*Proreus simulans*, *Euborellia stali*, and *E. annulipes*) are described; their economic importance, method of collecting and preservation, and the habit of *P. simulans* are given. Three references are given.

Y. C. NG

Lai, K. C. 黎國廉. The use of vertebrates in the control of insects. (In Chinese with title also in English) *Prob. of Insects* 2(4): 62-67, 1 tab., 1 fig., (5): 76-77, 1937.—Certain members of the families Cyprinodontidae and Poeciliidae; salamander, frog, and toad; birds (9 kinds); and 11 kinds of mammals are reported as the vertebrates used in the control of insects.

Y. C. NG

Langelier, Gustave. Puffins et petrels. *Natur. Can.* 64(8-9): 207-217, 1937.—Eighteen species of *Pterodroma*, *Pugodroma nivea* (Forster), and *Bulweria bulweri* (Jardine et Selby) are discussed as to distinctive characters and world distribution. The last is reported from the islands off the coast of China.

Larroque, P. Sélection des maïs. *Compt.-Rend. Trav., Inst. Rech. Agron. For.*, Indochine, 2: 233-292, 9 pl., 3 fig., 1937.—This contribution from the Laboratory of Genetics reports the methods used and results obtained in the analysis of 124 varieties of maize and the selection of 9 varieties best adapted to Indochina.

Larroque, P. Sélection des rizins. *Compt.-Rend. Trav., Inst. Rech. Agron. For.*, Indochine, 2: 295-336, 9 pl., 1937.—The first half of the paper is devoted to a résumé of work done on breeding and selection of castor-oil plants in other parts of the world. Following is an account of breeding work carried on in Indochina and characteristics of the different varieties.

La Touche, J. D. D. A handbook of the birds of eastern China (Chihi, Shantung, Kiangsu, Anhwei, Kiangsi, Chekiang, Fohkien, and Kwangtung Provinces). Part V. (Containing families Motacillidae, Alaud-

idae, Zosteropidae, Nectariniidae, Dicaeidae, Pittidae, and Eurylaimidae.) 1(5) :xx & 399-500, 2 pl., Taylor & Francis: London, 1930.—Part V concludes vol. 1 and the account of the Passeres. This volume includes 378 birds of 31 families from eastern China. The accounts of the various forms include English common names, synonymy, description, distribution, and notes on taxonomy, migration, and habits. Corrigenda and addenda and a systematic as well as an alphabetical index are supplied.

BIOLOGICAL ABSTRACTS

La Touche, J. D. D. A handbook of the birds of eastern China (Chihli, Shantung, Kiangsu, Anhwei, Kiangsi, Chekiang, Fohkien, and Kwangtung Provinces). 2(1) :1-96, 2 pl., 1931; (2) :97-192, 2 pl.; (3) :193-288, 2 pl., 1932; (4) :289-400, 3 pl., 1933; (5) : 401-496, 2 pl.; (6) :497-566, i-xxii, portrait, 1934. Taylor & Francis: London.—Part 1 contains families Picidae, Capitonidae, Cuculidae, Psittacidae, Coraciidae, Meropidae, Alcedinidae, Bucerotidae, Upupidae, Trogomidae, and Micropodidae; pt. 2, the Caprimulgidae, Tytonidae, Asionidae, Pandionidae, Aegypiidae, and Falconidae (part); pt. 3, the Falconidae (part), Columbidae, Pterochlididae, Phasianidae, Tetraonidae, Turnicidae, and Rallidae; pt. 4, the Jacanidae, Rostratulidae, Gruidae, Otididae, Glareolidae, Dromadidae, Stercoraridae, Laridae, Sternidae, Rhyncopidae, Charadriidae, and Scolopacidae (part); pt. 5, the Scolopacidae (part), Pelecanidae, Phalacrocoracidae, Sulidae, Phaethonidae, Fregatidae, Alcidae, Procellariidae, Puffinidae, Diomedidae, Plataleidae, Plegadidae, Ciconiidae, Ardeidae, and Anatidae (part); pt. 6, the Anatidae (part), Podicipedidae, and Colymbidae. The new subspecies *Yungipicus sclateri* *kurodai* (Picidae) is from Fohkien, Kiangsi, and Kwangtung; *Bubo bubo inexpectatus* n. subsp. (Asionidae) is from Chehli and Shensi. Corrigenda and addenda to volumes 1 and 2 and index are appended.

BIOLOGICAL ABSTRACTS

Lee, Lao-ying, 李落英. A list of Rotifera of China. *Peking Nat. Hist. Bull.* 11(4) :395-409, 1937.—This is a systematic list, with bibliographic references, of all species of Chinese rotifers so far on record. There is a total of 140 species (the specific names for 4 species are uncertain), 1 variety and 2 forms, representing 49 genera in 20 families. Most of the species were discovered from the border regions of China, the species of China proper having never been comprehensively studied.

Li, Feng-swen, and Chous, Shao-mu. The distribution of important cotton insects recorded in Chinese literature. (In Chinese with English summary.) *Ent. & Phytopath.* 5(15-16) :282-302, 15 maps, 1937.—A list of the chief pests of cotton in China is compiled from the literature, with references to over 200 periodicals. Those dealt with include *Platyedra (Pectinophora) gossypiella* Sand., *Aphis gossypii* Glov., *Agrotis* spp., *Earias cupreoviridis* Wlk., *Sylepta derogata* F., *Tetranychus telarius* L., *Emposaca (Chlorita) biguttula* Mats., and *Heliothis armigera* Hb. (*obsoleta* F.). Maps show the distribution of each, and notes are given on the severity of injury and the year in which each record was made.

FROM REV. APPL. ENT.

Li, Ju-chi, 李汝誠 Studies of the chromosomes of *Ascaris megalocephala trivalens*. 1. The occurrence and possible origin of nine-chromosome forms. *Peking Nat. Hist. Bull.* 11(4) :373-379, 1 pl., 1937.—The chromosomes of *A. m. trivalens* from Chinese horses were studied in order to determine the exact relation of the variety to *A. m. univalens* and *bivalens*. It was found that the germinal chromosomes are specific in form, thus differing from those of other types, and that the somatic chromosomes are probably less in number. One nine-chromosome form, proved to be a triploid of the six-chromosome form, was discovered. The evidence seems to indicate that the Chinese *Ascaris* is a distinct variety and bears little relationship to other well-known varieties. The newly found triploid furnishes us one of the few recorded cases of polyploidy among animals.

FROM AUTHOR'S SUMMARY

Lin, Shao-wen. 林紹文. Studies on Chinese Hydrozoa. I. On some Hydromedusae from the Chekiang coast. *Peking Nat. Hist. Bull.* 11(4) :351-365, 21 fig., 1937.—The present paper includes ten species, most of which are pelagic in habit and cosmopolitan in distribution. All ten are here recorded for the first time as occurring in China. The following were studied: *Stomotoca physophora* Uchida, *Leukartiara octona* var. *minor* n. var., *Turritopsis nutricula* McCrady, *Bougainvilia flava* Hartlaub, *Gastroblasta raffaelei* var. *chengshanensis* n. var., *Phortis lactea* Mayer, *Gonionemus murbachii* var. *chekiangensis* n. var., *Liriopae tetraphylla* Chamisso et Eysenhardt, *Aeginura grimaldii* Mass, and *Solmundella bitentaculata* Quoy et Gaimard.

Ling, J. C., and Yao, Y. T. The importance of *A. hyrcanus* var. *sinensis* Wied, as a malaria carrier in China, based on the studies of its blood meal and maxillary teeth index. *Peking Nat. Hist. Bull.* 11(3) :191-198, 5 tab., 1937.—Literature has shown that *A. hyrcanus* var. *sinensis* is not only a poor malaria carrier in this country when it is found alone, but is always a poorer carrier in comparison with the other malaria carrying species when they are found together. The reason for this is, according to the authors' work, that *A. hyrcanus* var. *sinensis* is primarily zoophilic in habit, and that when given free choice, this species of mosquitoes would always feed on domestic animals instead of man. The results of the study of the maxillary teeth index are not conclusive and the writers believe that further study must be carried on in order to obtain better results for comparison.

H. T. CHEN

Ling, Yong. 林鎔. Les composées chinoises de l'herbier de l'Academie de Peiping (suite). *Contr. Inst. Bot. Nat. Acad. Peiping* 3(4) :123-220, 12 pl., 1935.—This second and final paper on the Compositae in the Herbarium of the Academy of Peiping concludes the author's notes on this difficult family. He describes the following nine new species: *Olgaea echinantha* (Shensi), *Xanthopappus multicephalus* (Kokonor), *Circium pinnibracteatum* (Hopei), *Saussurea Lioui* (Sinkiang), *S. taipaiensis* (Shensi), *S. Kungii* (Shensi), *S. rufotricha* (Shensi), *S. flaccida* (Shensi), *S. rufostrigillosa* (Shensi). There are six new varieties. *Olgaea leucophylla* Iljin var. *aggregata*, *Saussurea acrophila* Diels var. *oligocephala*, *S. salicifolia* DC. var. *shensiensis*, *S. erisipes* Bunge var. *huashanensis*, *S. mutabilis* Diels var. *diplochaeta*, and *Taraxacum platypedicum* Diels var. *angustibracteata*. In addition, new combinations were made as follows: *Olgaea hmaorutaishanensis* Ling [*Carduus hsinowutaishanensis* Chen], *Circium Soulei* Ling [*Cnicus Soulei* Franch.], *Aster vilmorinii* Franch. var. *microcinctus* Ling [*A. nigrocinetus* Ling]. Considerable bibliography and extensive citations and distributional notes are added for almost all the species included.

F. P. METCALF

Liu, C. L. 劉崇樂. A bibliographic and synonymic catalogue of the Vespidae of China, with a cross-referring index for the genera and species. *Peking Nat. Hist. Bull.* 11(3) :205-232; 11(4) :331-350, 1937.—In the first section of this catalogue species are listed in systematic order under subfamily and genus with extensive bibliographic and distribution references. The second section is an alphabetical list of genera and species.

Liu, Kusum. Filariasis in Changsha. Preliminary report *Chinese Med. Jour.* 52(4) :579-582, 1937.—A total of 81 persons from Hsiang Ya Hospital were examined for microfilaria. Two of them were found infected with *M. bancrofti* and one with *M. malayi*.

H. T. CHEN

Liu, T. W. 劉潤華. Experiments for controlling *Aulacophora femoralis* Motsch. (In Chinese with English title.) *Inseckto Interesa* 2(12) :1-30, 31 tab., 1937.—This paper reports results on experiments in controlling the cucumber beetle by the use of various kinds of insecticides. The experiments

were carried on over a period of two years and the results are presented in four parts: (A) Control of adults, (B) control of eggs, (C) control of larvae, (D) control of both eggs and adults. Both mechanical and chemical methods of control were carried out. The author concludes that seedling plants should be protected by transparent paper bags. When the plant is about one foot high it may be sprayed with 1 : 1 : 130 (or 140) Bordeaux mixture once per week to avoid injury by the adult beetles. For larger plants Bordeaux mixture and lead arsenate, 1 : 1 : 150 : 0.5, should be used. Another good remedy for the adults is Pyrethrum, kerosene, and lime emulsion. Kerosene emulsion may also be used. For control in the egg and larval stages lysol in a 1 : 600 dilution may be poured around the basal portion of the plants.

Y. W. DJOU

Liw, T. W., and Liw, S. P., 劉調化, 劉善邦. Some experiments on self-made insecticides for controlling certain injurious insects. (In Chinese with title also in English) *Insekto Intervista* 2(11) 5-22, 1937.—Following a short introduction this paper arranges in tabular form 23 insecticides with their formulae, methods of preparation, dilution, kinds of insects to be controlled on particular plants, number of applications, and percentage of kill.

Y. W. DJOU

Loesener, Th. Celastraceae novae vel minus cognoscendae II. *Notizblatt bot. Gard. Mus. Berlin-Dahlem* 13 (11) 215-226, 1936.—The only plant mentioned from Asia was the new variety for *Gymnosporia berberoides* W. W. Smith var. *glabra* Loes. represented by Simon Teu 169 378 from Yunnan.

F. P. METCALF

Lui, Ho-chang. Notes on the investigation of the pine caterpillar (*Dendrolimus* sp.) in the Forestry Experiment Station, Li Shun Hsien, Chekiang (In Chinese with English summary) *Ent. & Phytopath.* 5(13) 240-246, 1 map, 1937.—During the past few years, pine trees in Chekiang have been attacked by *Dendrolimus* sp. In the spring of 1937, a serious outbreak occurred, the infested area covering about 135 acres. Natural enemies found were a Braconid, *Rhogas spectabilis* Mats., an Ichneumonid of the genus *Rhytmonotus*, a Reduviid bug and a fungus. This moth develops best in a high, dry, sunny situation.

FROM REV. APPL. ENT

Ma, Tsing-chao. 馬駿超. On the occurrence of *Apis dorsata* F. in Hainan (Hym. Apidae). (In Chinese with title also in English) *Prob. of Insects* 2(5) 70-75, 1937.—Key to the Chinese species of *Apis*, habit, references, description, and key to the varieties of *Apis dorsata* F. are treated. The description, collecting locality, and the institution where the type is deposited, distribution, and references are given to each variety. The references are mostly in English.

Y. C. NG

Ma, Tsing-chao. 馬駿超. On some *Vespa* and *Levpula* species of China (Hym. Vespinae). *Ent. & Phytopath.* 5(2) 29-34, 1937.—Eighteen forms, including one new variety and two new combinations, are discussed. The new variety is *Vespa dybowski* *mutata* and is from Hangchow. The male of *Levpula vulgaris* *flaviceps* (F. Smith), hitherto unknown, is described.

W. E. H.

Majid, Syed Abdul. An improved technique for marking and catching mosquitoes. *Rec. Malaria Surv. India* 7(1) 105-107, 1 pl., 1 fig., 1937.—For counting and identifying mosquitoes before marking, as well as for the subsequent examination later, the mosquitoes may be stunned by placing about twenty of them in a test tube and exposing them for about three seconds to the effects of a drop of chloroform placed on the cotton plug. The marking is done by a dusting pump, which consists of a 1" x 3" specimen tube fitted with a rubber stopper bearing two short, curved pieces of glass tubes of small diameter. One of these tubes is connected with a

rubber bulb. The other serves as an outlet for the marking powder. The marking powder consists of "Gold" powder used by printers. It is also obtainable in silver and in colours. The apparatus is figured. W. E. H.

Maloeuf, N. S. R. The biology of light-production among the Arthropods. *Science Progress* 32(126) 228-245, 1 fig., 1 tab., 1937.—The subject is discussed under the following headings: distribution and structure of the light-producing organs; behavior; chemical phenomena; and physical phenomena. Luminescence occurs in Coleoptera (chiefly Elateridae and Lampyridae), Lepidoptera, Diptera, Hemiptera, Neuroptera, Collembola and other orders, and also in Crustacea and Myriapods. Luminescence apparently serves for sexual attraction in beetles but not in centipedes; it is an oxidative process, controlled by the oxygen supply to the luminescent cells. A luminescent body is defined as one which radiates light at a low temperature and whose light is not the result of the absorption of radiant energy. Since luminescence liberates no apparent heat or any other form of energy except visible light, it appears to be 100 per cent efficient. The author documents his paper by frequent references to other authors and includes a list of seventy-one references. W. E. H.

Mandl, Karl. Vorarbeiten fur eine monographische Nenbearbeitung der palaearktischen Cicindelen. *Arb morph. Ent. Berlin-Dahlem* 4(3): 236-240, 20 fig., 1937.—The races of *Cicindela sachalinensis* Mor. are distributed through Japan, Sachalin, southeastern Siberia, Korea, Mongolia, north and central China.

Marasigan, P. C. Localization of rubber in three Philippine species of *Ficus*. *Nat. & Appl. Sci. Bull. (P.I.)* 5(3): 257-287, 11 fig., 1 tab., 2 pl., 1936 (Rec'd Jul. 1937).—*Ficus elastica* (a species also common in China), *F. calophylloides* and *F. minahassae* are discussed. Twenty-nine references are given. W. E. H.

Maurand, P. Etude comparee de huit essences forestieres sud Indochinoises principales en peuplement pur très jeune (11 à 13 ans). *Compt. Rend. Trar. Inst. Rech. Agron. For., Indochine*, 2 403-412, 3 pl., 8 fig., 1 tab., 1937.—A study of sao (*Hopea dealbata*), cam-xe (*Aglia dolabri formis*), Go-mat (*Sinodora cochinchinensis*), trac (*Dalbergia cochinchinensis*), sen or xen (*Shorea cochinchinensis*), dâu con rai (*Dipterocarpus alatus*), cùm lui (*Dalbergia barriensis*), vàp (*Messers fereia*).

Mell, R. Beitrage zur Fauna sinica. X. Die Agaristiden Chinas (Lepidopt. Heteroc.). *Stett. Ent. Zeit* 97(2) 161-188, 18 text fig., 1 tab., 1936.—The biology, taxonomy, and geographical distribution of this family are discussed. In this part of the series species of the following genera are discussed: *Euxala* Jdn., *Scrobigerina* Jdn., *Mimeusemia* Blr., *Seudryia* Stretch., *Syfania* Oberth., and *Cruriopsis* Jord. New forms are *Euxala dentatula* albomaculata f. vern. *flavomaculata* from south China, *Seudryia interposita* ssp. *luangtungensis* from Kwangtung and Chekiang, *S. venusta* var. *yuunana* from Chekiang, *Syfania dubernardi* ssp. *taipeishanis* from south Shensi.

Merino, Gonzalo. Philippine Cicadellidae (Homoptera). *Phil. Jour. Sci.* 61(3): 307-400, 4 pl., 1936.—This extensive work is prefaced by a very able discussion of the following topics: Economic importance; life history; geographic distribution; systematic relations; chief characteristics of the family. About three dozen new species and one new genus (*Roxasella*) are described. Many of the species are very widely distributed while still others belong to genera of wide distribution. Species treated which are definitely known from China include *Cicadella ferruginea* Fabr. and *Krisna strigicollis* Spinola. Species (as yet unidentified) of *Bythoscopus*, *Athyarus*, and,

Parabolocratus are common in China. It is likely that a great many of the species treated in this paper will be found to occur in China—in any event this paper will be very useful to any workers on the family Cicadellidae in China.

W. E. H.

Merrill, E. D. Miscellaneous notes on Philippine botany. *Phil. Jour. Sci.* 60(1) :27-35, 1936.—The notes refer to species in a dozen different families and refer to at least one Chinese form, *Lysinachia fragrans* Hayata. The author concludes that *Mucaranga sinensis* (Baill.) Muell.-Arg., earlier thought to occur in China, should be removed from the Chinese list. W.E.H.

Merrill, E. D. Otto Kuntze's new genera and new species of Indo-China plants. *Buitonia* 2(3) : 189-200, 1936.—The author points out that most botanists have overlooked the fact that in Kuntze's "Revisio Generum Plantarum" are a number of new genera and new species. This was due to the thought that this was considered primarily a bibliographical work. Kuntze actually visited Indo-China in 1875 and collected rather extensively. Details in regard to these species are given with field notes, synonyms and citations. A number of new synonyms are included but are not specially marked. Three new combinations are also proposed, *Desmodium Godefroyanum* (O. Kt.) Merr. [*Meibomia Godefroyana* O. Kt.], *Tricalysia parrifolia* (O. Kt.) Merr. [*Discospermum parrifolium* O. Kt.], and *Vernonia burmanica* (O. Kt.) Merr. [*Cacalia burmanica* O. Kt.]. F. P. METCALF

Meyrick, Edward. [Descriptions of new Microlepidoptera.] *Exotic Microl.* 5(2) :33-64, 1936; 5(4) :97-128, 1937; 5(5) :129-160, 1937.—The following new species are described from China in part 2. *Gracilaria zopherotarsa* from Kuanhsien and Mt. Omei; *Gelechia argodoris*, *G. pagicola*, *G. sciocrypta*, *G. digrapha*, *Dichomeris parathes*, *Eutorna annosa*, and *Tinea malthacopsis* from Tai-shan; *Tortrix hotoma* from Szechwan. *Lithocolletis dorinda* Meyr., *Acrocercops clusiopa* Meyr., and the new species *Acrocercops heptadeta*, *Paretopta geometropis*, *Gracilaria chrysolampra*, *Comiogenes contempta*, *Thiotricha acrophantis*, *Dichomeris ochthophora*, *Homaloxestis notolychna*, *Eulechria colonialis*, *Periacma pontiseca*, *Lyonetia anthemopa*, and *Capua pediatella* are from Formosa. In part 4, *Cacoecia semistricta* n. sp. is described from Taichow, China. In part 5, the following are recorded: *Acrobasis sarcotorax* n. sp. from Taichow and *Pandanus emptycta* n. sp. from Pehlingting.

Milsum, J. N. Decis cultivation in Perak. *Malayan Agri. Jour.* 24(8) :390-392, 1936.—The author believes the species under cultivation in Perak is *D. malaccensis* Prain. Cultivation, harvesting, yields, and marketing are discussed. The information given concerning this insecticide plant should be useful to growers in China.

W. E. H.

Mistshenko, Leo. Orthoptera palearctica critica. XII. Revision of Palearctic species of the genus *Sphingonotus* Fieber (Orth. Aev.). *Eos* 12(1-2) :65-192, 74 text fig., 1936; 12 : (3-4) :193-282, 13 text fig., 1937.—The genus is very widely distributed. In Asia the northern boundary runs approximately along latitude 55°N, except in the northern and southeastern regions. *Sphingonotus zaizanicus* sp. n. is from Tsaidam; *S. beybienkoi* sp. n. from Mongolia and N. China; *S. elegans* sp. n. from Mongolia; *S. yunnaneus* Uvarov from SW. China; *S. carinatus* Saussure from W. Mongolia; *S. mongolicus* Saussure from Mongolia, Manchuria, Korea, and N. China; *S. coeruleipes zaizanicus* subsp. n. from W. Mongolia; *S. nebulosus* (Fischer de Waldheim) from W. Mongolia; and *S. obscuratus latissimus* Uvarov from W. Mongolia.

Moriyama, J. On the rice bran and rice bran oil. (In Japanese with English title) *Formosan Agri. Rev.* 369 :638-643, 3 tab., 1937.

National Agricultural Research Bureau. A study of the consumption of staple food products in rural China. (In Chinese and English.) *Crop Reports* 5(6) :189-201, 5 tab., 1937.—Tables show the amount of the chief food constituents in the diet, percentage (by weight) of the chief food constituents, amount of eggs and meat consumed annually per capita, as well as the percentage of the chief staple food products used for different purposes in China.

Navas, Longin. Nevopteres et insectes voisins Chine et pays environnements. *Notes d'Ent. Chin.*, Musée Heude, 3(4) :37-62, fig. 66-76, 1936.—Several families of Odonata (Paraneuroptera of the present author), Neuroptera, Megaloptera, Mecoptera, and Raphidioptera are discussed. About nineteen new species are described.

W. E. H.

Needham, James G., and May, K. Gyger. The Odonata of the Philippines. *Phil. Jour. Sci.* 63(1) :21-101, 10 pl., 2 text fig., 1937.—This excellent paper treats a number of species including about a dozen new ones. There are keys and verification tables to nymphs and adults and many illustrations including a page of structural drawings. *Ajax julius* Brauer, *Gynacantha hyalina* Selys, and *Brachythemis contaminata* Fabr. are species which occur in China. Many of the species recorded from Indo-China, Formosa, Burma, and India will no doubt later be taken in China. W.E.H.

Ngai, Chung Jen, 艾中仁. [Trapping insects by spider's web.] (In Chinese.) *Nung Pao* 4(22) :1115, 1937.—Spider's web is useful for trapping adult insects feeding on melon leaves because it is sticky and does not injure the plants. Fresh webs should be used each time and the best time for trapping is from 9:00 to 12:00 A.M. The web is placed on a circular wire like the frame of an insect net and is used in a manner similar to "sweeping" with an insect net.

H. W. TSANG

Novelli, N. Saggio di classificazione botanica dei risi coltivati. *Quaderni della stazione sperimentale di risicoltura* No. 16, 59 p., 27 fig., 2 pl., 1936 (Rec'd Mar. 1937)—This paper relates to the botanical classification of cultivated rices. The earlier work is reviewed and that of G. G. Gustchin considered as the best. The present author believes that it is necessary: to add some characters, to simplify the classification of colors used for flowering glumes, to consider the pigmentation of the empty glumes, to give more value to the actual length of the spikelet and to consider its length as compared with its width.

W. E. H.

Nukada, Minoru. Extract from silkworm pupae. A useful substitute for meat extract in the preparation of bacteriologic culture media. *Phil. Jour. Sci.* 60(1) :11-18, 9 tab., 1936.—The author contends that the extract made from silkworm pupae is in every way equal to, in some cases better than, beef extract for the preparation of bacteriological culture media. The dead silkworm pupae being a waste product of the silk industry are in several countries very abundant and of the course cheap. Laboratories engaged in large scale production of cholera or typhoid vaccines may reduce their expenses for culture media by about 75 per cent

W. E. H.

Obenberger, Jan. Etude analytique du genre *Janthe* Mars. de la région orientale et paléarctique. (Col. Bupr.) *Shornik Entom. Odd. Nár. Musea v Praze* 14(122) :5-12, 1936.—Sixteen species are discussed including four from Indo-China.

Obenberger, Jan. De novis regionis orientalis Agrili generis speciebus (Col. Bupr.) II. *Casopis Cs. Spol. Ent.* 33(1-2) :33-44, 1936.—*Agrilus Amulius*, *A. Miwza*, *A. Feretrius*, and *A. Cardaces* are new species from Formosa. *A. Bacchaeus* n. sp. is from Tonkin.

Obenberger, Jan. De speciebus novis palaearcticis generis *Agrilus* (Col. Bupr.). *Casopis Cs. Spol. Ent.* 33(3):104-118, 1936.—*Agrilus Mongolorum* and *A. Mahyi* n. spp. are from Mongolia, *A. pekinensis* var. *aureosplendidus* n. var. is from Manchuria, *A. Kratochvili* n. sp. from Formosa, and *A. yunnanicola* from Yunnan.

Ogawa, M. On the sclerotial diseases of rice plant in Formosa. (In Japanese with English title.) *Formosan Agri. Rev.* 369:632-637, 1 tab., 1937.

Ohwi, Jisaburo. Cyperaceae Japonicae I. A synopsis of the Caricoideae of Japan, including the Kuriles, Saghalin, Korea, and Formosa. *Mem. Coll. Sci. Kyoto Imp. Univ.*, Ser. B 11 (5). 229-530, 21 text fig., 10 pl., 1936.—An extensive and complete work on the genera *Carex* and *Kobresia* of Japan, including Korea and Formosa. Descriptions of all sections and species are given in Latin, full synonymy is added, with extensive citations to show distribution. Keys are included and a number of the species are illustrated. A very valuable and indispensable work for all students of the Asiatic Cyperaceae. F. P. METCALF

Ohwi, Jisaburo. Plantae novae Japonicae I, II, & III. *Jouz Jap. Bot.* 12(5). 328-335; 12(6) 379-390; 12(9) 652-665, 1936.—The majority of the species described and notes given actually represent species native to Korea, Formosa, Liu Kiu and Japan, but the following pertain to China: *Puucella Kengiana* Ohwi nom. nov [P. stricta Keng, non Blom] from Kiangsu; *Carex hypolephara* Ohwi & Ryu sp. nov from Lushan, Kiangsi; *Carex scabrisaccata* Ohwi & Ryu sp. nov. from Lushan, Kiangsi; and *Carex Tangiana* Ohwi sp. nov from Hopei. F. P. METCALF

Ohwi, Jisaburo. Symbolae ad floram Asiae Orientalis 14 東亞植物資料 14 *Tetra Phytotax et Geobot.* 5(3) 179-188, 1936.—A continuation of miscellaneous notes on oriental Asia, with numerous new species, varieties and new combinations. Among them is included a single new species from China, namely, *Carex Echimus* Ohwi from Szechwan. A summary in Japanese is appended. F. P. METCALF

Okumura, Teiichi. Three new and one unrecorded species of Odonata from Korea. *Insecta Matsum.* 11(3) 122-128, 1 pl., 2 text fig., 1937.—The new species are: *Opnogomphus forcicula*, *G. emarginatus*, and *G. coreanus* Doi & Okumura. *Dardus lunatus* Bartenev is newly recorded for Formosa. W. E. H.

Ou, S. H. The soft rot of sweet potato and its control. *Sinensis* 7(1) 50-62, 8 tab., 1936.—The annual production of sweet potatoes in China is said to be more than 26 billion catties, thirty to forty per cent of which spoil in storage. The rot is caused by *Rhizopus delemar* (Boudin) Wehner & Hanzawa and the symptoms of the disease are similar to the soft rot caused by *R. nigricans* Ehren. The results of experiments are shown in the tables. As a result of the studies the author advises the following: Dig the sweet potatoes on a dry day, handle carefully, dry before storing. Do not store bruised or diseased potatoes. The bottom of the storage pit should have a layer of lime and naphthalene balls, at the rate of 20 grams per cubic foot of space, mixed with the potatoes. The opening of the pit should be covered to prevent evaporation of the naphthalene. W. E. H.

Pal, Yin-Yuan, 白應元. An enumeration of plants collected from Shensi during 1934. *Contr. Inst. Bot. Nat. Acad. Peiping* 3(5):243-298, 1935.—The author enumerates in a very briefly annotated list all the plants collected from Chungnanshan and Taipishan, Shensi, in 1934. Some 300 species and 39 varieties distributed in 190 genera and 84 families are included. F. P. METCALF

Parsons, T. H. The cultivation of citrus with further suggestions for its improvement. *Trop. Agriculturist* 87(3):133-155, 8 pl., 1936.—The following topics are discussed: citrus producing countries; stocks suited for this country; orange groups and varieties, grapefruit varieties; propagation and planting; cultivation; pruning; manuring; crops; pests and diseases. Much of what is said is probably applicable to conditions in south China.

W. E. H.

P'ei, Chien. New and noteworthy clematises from southern and southwestern China. *Sinensis* 7(4):471-476, 1 fig., 1936.—The author reports 13 species and one variety of *Clematis* from the provinces of Kweichow, Yunnan and Kwangtung. A single new species is described, *C. taxipaniculata* P'ei, from Yunnan. The majority of these represent species collected by Y Tsiang in Kweichow and Yunnan during 1930 and 1932, only two being mentioned from Kwangtung, which is, I believe, more rich in *Clematis* than Kweichow.

F. P. METCALF

Ponce, Andrés. The melon fly (*Dacus cucurbitae* Coquillett). *Phil. Jour. Agri.* 8(3):289-310, 4 pl., 7 tab., 2 charts, 1937.—This pest of cucurbits is common and destructive in the Indo-Malaysian region, including southern China and Hong-Kong. Its life history in the Philippines is discussed. Destruction of infested fruits and bagging of young fruits are recommended for control. White arsenic and sodium arsenite were the most toxic of the baits tried.

Potts, C. G. Milk goats. *U.S. Dept. of Agri. Farmers' Bull.* 920, 35 p., 17 fig., 1 tab., 1918 (rev. 1937)—In China, at least in South China, the keeping of goats is on the increase, and this office has received several inquiries recently concerning the management of goats. The present bulletin supplies the answers to some of the questions which have been asked. The contents are as follows. Present status of the industry, goats' milk, goat dairies, breeds and types of goats, methods of breeding, feed and management, goat-neat and goatskins, prices of goats, goat troubles, milk-goat registry associations. The figures illustrate breeds and types of goats, the arrangement of a practical goat dairy, and the detailed construction of stalls, mangers, milking stands and fences.

W. E. H.

Prout, Louis B. New and little-known Bali Geometridae in the Tring Museum. *Vocat. Zool.* (Tring, England) 40(2):177-189, 1937.—Of the 40 species mentioned *Eumelea biflavata* Warr. is recorded from Tonkin, Hainan and Formosa; *Uliocnemis castalaria lepturges* subsp. n. is from Tonkin and W. China.

Ramakrishna Ayyar, T. V., and Anantanarayanan, K. P. The stem-borer pest of rice (*Schoenobius incertellus* W.) in S. India. *Agri. Live stk. Indu* 7(2):171-179, 1937.—This account of the bionomics and control of *S. incertellus* is based partly on literature and partly on observations made in India.

Réteaud, Louis. Compte-Rendu des travaux 1935 & 1936. *Inst. Rech. Agron. For* 1:1-175, 101 fig., 10 tab., 1937.—This volume contains the report of the director of the Institut des Recherches agronomiques et forestières de l'Indochine. The first chapter discusses the organization and objectives of the different sections of the Institute. The second chapter is devoted to the work of the laboratories of chemistry, phytopathology, entomology. The work of the experiment stations and the divisions for crop culture, forestry, and fisheries are treated in the remaining chapters. The second volume of this series is devoted to reports of results of research done in the various stations and laboratories.

Sasaki, Syun'iti. Miscellaneous contributions to the flora of Formosa. XII. *Trans. Nat. Hist. Soc. Formosa* 26 (149):59-66; XIII. *ibid.*

26 (150) :127-138, 1938.—A continuation of the brief notes on the flora of Formosa, the twelfth instalment being entirely devoted to ferns and the thirteenth to ferns, gymnosperms, grasses, sedges, and other monocotyledons. Distribution including China is given. A Japanese summary is appended.

F. P. METCALF

Scatizzi Branchini, I. L'accrescimento delle cellule delle gian-dole serigne nel corso dell'eta in *Bombyx mori* L. *Boll. Soc. Ital. Biol. Sper.* 12(9) :632-633, 1 tab., 1937.

Scatizzi Branchini, I. Il numero dei chromosomi in varie razze di *Bombyx mori* L. *Boll. Soc. Ital. Biol. Sper.* 12(9) :631-632, 1937.

Schauberger, E. Zur Kenntnis der paläarktischen Harpalinen. Ueber *Trichotichnus*-Arten. *Koleopt. Runds.* 22 (1-2) :1-22, 1936.—There is a key to the species of the *laevicollis* group and to those of the subgenus *Amaroschesis*. The new species *T. obtusicollis*, *T. curtipennis*, *T. zabriiformis*, *T. denticollis*, and *T. cordaticollis*, *T. Tschitscherini* (n. n. for *T. vicinus* Tschit.), 8 other species, and 2 subspecies are reported from Szechwan. Three species are recorded from Yunnan.

Schmidt, Erich. Die westpaläarktischen Gomphiden-Larven nach ihren letzten Hauten (Ins. Odon.) *Senckenbergiana* 18(5-6) :270-282, 1 tab., 10 fig., 1936.—Eleven species are described and figured, including *Gomphus flavipes* Charp. from Manchuria.

Shan, R. H. Studies on Umbelliferae of China I. (*Hydrocotyloideae*, *Saniculoideae*). *Sinensis* 7(4) :477-489, 1936.—The first paper of a series reporting on the Umbelliferae of China. In this paper the following genera are treated: *Hydrocotyle*, *Centella*, *Dickinsia*, *Sanicula* and *Eryngium*. Keys are included to the species in each genus and numerous specimens are cited. The literature listed is confined to the original publication of the species and an occasional synonym. Except for the keys I see little that is original and some species of these genera, known from China, are omitted.

F. P. METCALF

Sharga, U. S. The insecticidal properties of kerosene and lubricating oil-emulsions. *Current Science* 5(8) :449-450, 1937.—The insecticidal properties of oil-emulsions depend upon the following: (1) The manner in which the oil is mixed, (2) kind and quantity of soap used, (3) type of oil, (4) composition of the water employed, and (5) temperature of the emulsions used for spraying. All factors being similar, oils with 80-100 viscosity (resistance to flow, "Saybold test") are quicker to emulsify than those between 30-40 viscosity. The size of the globules in the emulsions determines their insecticidal property. The author has made laboratory and field observations with kerosene and lubricating oil-emulsions, and noted their actions on many kinds of insects including scale insects. The subject is discussed under the topics: Stability; viscosity and volatility; wetting and spreading; saturated and unsaturated oils. In the control of scale insects, the large size of globules, rather than wetting power, is important. Emulsion from lubricating oil is less dangerous to foliage than kerosene emulsion. It is less likely to cause canker and its use against scale insects in India appears to be very promising.

W. E. H.

Shibata, K. Relation between lemon-fruit and damage by the fruit-fly, *Chaetodacus ferrugineus* var. *dorsalis* Hendel. (In Japanese). *Jour. Soc. Trop. Agric.* 9(1) :60-68, 1937.—*D. dorsalis* is a serious pest of the fruits of *Citrus* in Formosa, but the larvae do not infest lemons, though the females oviposit in them. An account is given of experiments showing that the eggs hatch readily in the skin of the lemon and that the larvae mature when fed on the inner part of the fruit, but that lemons are immune from

infestation because the inner skin is too hard to be penetrated by the ovipositor of the fly or by the newly hatched larvae (which cannot survive without feeding for more than 76 hours at 30°C). Grapefruit is also immune for the same reason.

FROM REV. APPL. ENT.

Shibuya, T. Effect of growth hormone on the rooting response of Assam tea cuttings. (In Japanese with English title.) *Formosan Agri. Rev.* 370:708-710, 1 fig., 1937.

Shropshire, L. H., and Compton, C. C. Saving garden crops from insect injury. *Univ. of Ill., Coll. of Agri., Agri. Exp. Sta., Circ.* 437, p. 3-53, 27 fig., 1935.—The insects discussed are, of course, American insects under American conditions, but a large part of what is said, particularly in regard to control methods, can readily be adapted to conditions in China where the same plants are under cultivation. Many of the insects discussed are illustrated.

W. E. H.

Squire, F. A. A theory of diapause in *Platyedra gossypiella* Saund. *Trop. Agriculture* 14(10):299-301, 2 fig., 6 tab., 1937.—This paper refers to the Pink Boll-worm of cotton, *Platyedra gossypiella* Saund., a widely distributed species which is of considerable economic importance in China. The resting stage of this insect has long been under study. This resting stage has been considered as aestivation by some authors, hibernation by others. The present author believes this condition to be a case of diapause induced by dry or rich food toward the end of the crop regardless of the time of year. The writer's observations indicate that only such larvae as complete their larval development on ripening seeds are likely to go into the resting stage. The addition of water to the tissues of resting larvae usually hastens emergence, but this is not always the case. The diapause of this insect is compared with that of several other species. Eight references are given.

W. E. H.

Steward, Albert N., and Cheo, S. Y. Observations on the habits and customs of the tribespeople in northern Kuangsi Province. *Peking Nat. Hist. Bull.* 12(1):19-22, 1937.—The province is dominated by Chinese but there are at least four tribes of more primitive people present. There are miscellaneous notes on the tribal divisions and dress, villages, and social customs.

Sun, C. J., and Wu, C. C. Notes on the study of kala-azar transmission: Part II. Further observations on the natural infection of *Phlebotomus chinensis* with *Leptomonas donovani*. *Chinese Med. Jour.* 52(5):665-673, 2 maps, 3 tab., 1937.—From two villages in north Kiangsu, 11 *P. chinensis* were found naturally infected with *L. donovani*. In one village, 10 of 483 dissections were positive showing an infection rate of 2.07%; in the other, 1 of 54 dissections was positive, the rate being 1.85%. The flagellates were found in the hindgut and anterior part of the proventriculus as well as in the midgut. In view of the wide distribution of *P. chinensis* in kala-azar districts in N. Kiangsu and the frequency of natural infection with *L. donovani* of this species, it may be asserted that *P. chinensis* is the chief, if not the only, vector of kala-azar in China.

Suzuta, I. The oil of kenaph seed. (In Japanese with English title.) *Formosan Agri. Rev.* 369:604-610, 6 tab., 1937.

Svensson, H. K. Monographic studies in the genus *Eleocharis*. IV. *Contr. Brooklyn Bot. Gard.*, No. 77: 210-231, 237-273, 6 pl., 23 maps, 1937. (Reprinted from *Rhodora* 39:462, 463, 1937.)—Most of the 38 species discussed are confined to the southeastern United States, Cuba, the warmer parts of South America, tropical Africa and Madagascar. Description and locality records are given for each species. *Eleocharis Chaetaria* R. & S. is reported from Indo-China.

Tai, F. L., 戴芳瀾. A list of Fungi hitherto known from China. II, III, IV. *Sci. Repts. Nat. Tsing Hua Univ. Ser. B* 2(4, 5, 6) :191-639, 1937.—Alphabetical lists of Fungi with host plants and, in some cases, brief descriptions are given. In Part II, 677 Ascomyces are treated; 1077 Basidiomycetes in Part III; and 753 Fungi Imperfecti in Part IV. There is an alphabetical host index.

Takagi, M. Upon the extermination and prevention of *Citrus Melanauster*. Preliminary report. (In Japanese.) *Hort. Trop.* 7(1) :27-34, 1937.—*M. chinensis* Forst. causes serious injury to *Citrus* trees in Formosa. Oviposition occurs in the basal parts of the stems and may be prevented by brushing them with a wash consisting of 200 lb. lime, 30 lb. lard, 30 lb salt and 3 lb lead arsenate in 80 gal water, or by covering them with newspaper, straw or palm leaves, though such covers afford shelter to Coccids and ants. Up to 90% mortality of the larvae may be obtained by injecting formalin or calcium cyanide into their burrows; carbon bisulphide is less effective.

FROM REV. APPL. ENT.

Takahashi, R. A new genus and species of Aphididae from Formosa (Homoptera). *Annot. Zool. Jap.* 16(1) :17-19, 1 fig., 1937.—*Trichostaphorus aceris* on *Acer rubescens*.

Takahashi, R. Some Coccoidea from Formosa and Japan (Homoptera), II. *Mushi* 3(2) :69-72, 1937.—One new species from Formosa is included.

Takahashi, Tyoichi. Additions to the aphid fauna of Formosa (Hemiptera), IV. *Phil. Jour. Sci.* 63(1) 1-19, 3 tert fig., 1937.—The following are new: *Lachnus tatakaensis* from *Sabice* sp., *Greenidea nigra* Maki var. *kanzanensis* and *Paratrichosiphum nittakae* from species of Fagaceae, *Macrosiphum euryae* from *Eurya* sp., *Acyrtosiphon rhododendri* from *Rhododendron oldhami* Maxim., *Cavariella japonica* Essig and Kuwana var. *nigra* from *Salix fulvo-pubesens* Hayata, *Aphis arundinariae* from *Arundinaria nittakayamensis* Hayata, *Aphis stranvaesiae* from *Stranvaesia nittakayamensis* Hayata, and *Thoracaphis tarokoensis* from *Quercus spinosa* David. Six other species are recorded from the Island.

Taschidjian, E. The norm and its conception in biology with special reference to eugenics. *Peking Nat. Hist. Bull.* 11(4) :321-523, 1937.—The occurrence of directional, teleological and normative impulses in the realm of natural science is studied. It is found that vectors and functions contain directional, normative elements. Recent advances in developmental morphology and physiology have proved that in each organism a normative entelechy exists and it is proposed that the content of this entelechy should be adopted as a basis for the classification of organisms into different species. It is found that with all plants and animals, the entelechy provides for their adaptation to a certain range of environmental factors, whilst in man on the contrary the entelechy demands the adaptation of the environment to man. Judged by animal norms, man therefore is essentially degenerate, but measured by the human norm he is the healthier the more he is able to conquer nature. Man has achieved his domination of nature by studying its laws and using them to his advantage and by social collaboration. Eugenic evaluation of human individuals as well as of populations and races should be measured according to their harmony with this normative tendency and not according to the animal norm of health.

AUTHOR'S SUMMARY

Teilhard de Chardin. Peking man—our most ape-like relative. *Nat. Hist.* 40(2) :514-517, 8 fig., 1937.—There is a very brief review of the finding of the skulls of the Peking man with pictures of the site of the excavations.

Teng, S. C. Additional Fungi from China II. *Sinensis* 7(4) :490-527, 33 fig., 1936.—There are descriptive and distributional notes on 54 species including the following new ones: *Gliomella angustispora*, *Bulliardella pulchella*, *Mytilidion oblongisporum*, *Lophium caulinolum*, *Nectria mellea* Teng et Ou, *Coronophora erigua*, *Rhynchostoma lageniforme*, *Amphisphaeria hainanensis*, and *Anthostomella gigantea* from Hainan; *Dimerina bambusicola* from Kiangsi; *Chaetothyrium sinense* and *Laxiosphaeria bambusicola* from Chekiang; *Podospora strobiliformis* from Kiangsu, Chekiang, Anhwei, Kiangsi, Yunnan, and Hainan; *Neopeckia asperulicpora* from Hunan, Yunnan, and Hainan; *N. herpotrichoides* Teng et Ou, *Acanthostigma bambusicola* Teng et Ou, and *Physalospora ilicella* from Kiangsu; *Chaetosphaeria perforata*, *C. caelestinoidea*, *Bombardia phaeocaudata*, *Melanomma pulvraea* Teng et Ou, and *Amphisphaeria asterostoma* from Yunnan; *Cucurbitaria sinica* from Hopei; *Thaxteriella lignicola* from Hunan and Hainan; *Lophiotrema gracile* Teng et Ou from Hainan and Yunnan; *Massarina bambusina* from Szechwan; *Linospora querrecola* and *Jalsaria lignicola* Teng et Ou from Anhwei; *Thyridium coecicolum* from Anhwei, Yunnan and Hainan. *Pharonectria manilensis* (P. Henn.) Saec. var. *eflusa* from Hainan, *Acanthostigma bambusicola* var. *major* Teng et Ou from Yunnan, and *Physalospora ilicella* var. *minor* from Kiangsu are also new.

Teng, S. C. Notes on Gasteromycetes from China. *Sinensis* 6(6) : 701-724, 8 fig., 1935[1936].—Forty five species and varieties from China are treated in a uniform manner including references, synonyms, brief description, and distribution (which specimens cited). Eight of the species are figured by photographs.

W. E. H.

Tinkham, E. R. Notes on a small collection of Acrididae from north China and eastern Mongolia (Orthoptera, Acrididae). *Peking Nat. Hist. Bull.* 12(1) :47-51, 1937.—*Ergatettix dorsifera* (Walker), *Acridium subulatum* (Linnaeus), *A. sjoestedti* (Bei-Bienko), *A. kraussi* (Sauleit), *A. japonicum* (Boliver), and *A. longulum* (Shiraki) are reported.

Toumanoff, C. La reproduction en captivité de *A. vagus* au Tonkin. *Bull. Soc. Med. Chir. l'Indochine* 15(7) :776-784, 3 fig., 1937.—A laboratory cage for breeding this mosquito is described and figured.

True, Gordon H. Jr. The chukar partridge of Asia. *Calif. Fish & Game* 23(3) :229-231, 1 fig., 1937. **Bade, August.** The chukar partridge in California. *Calif. Fish & Game* 23(3) :232-236, 2 fig., 1937.—These two articles refer to the Chukar, *Alectoris grisea chukar*, one of twenty two varieties of a single species of partridge, which is widely distributed in Eastern Asia and has recently been introduced into California as a game bird. The flesh is of excellent flavor, and the behavior of the bird makes its shooting a sport of the first rank. The bird can adapt itself to almost any ecological condition and should, therefore, find an ideal home in California with its variety of ecological conditions. The food of this bird consists of reeds, small fruits and berries, leaves, green-shoots, certain kinds of roots, and insects. It also feeds on cultivated grains but does not disturb growing crops. As an indication of this bird's ability to maintain itself, we mention the fact that some hens in captivity have laid as high as 136 eggs in one season. One man was able to rear to maturity 400 birds from a nucleus of 13 pairs. Certain varieties of this bird are native to Northern China, and sometime in the future when we wish, in certain portions of China, to attempt to reestablish game birds, we may well profit by the experience which California has had with one of the Indian varieties of the Chukar. W. E. H.

Tsai, P. H., and Chun, N. M. Some notes on the natural enemy, sexuality, and other characteristics of the Paddy Skipper (*Parnara guttata* Bremer) observed during the autumn of 1936, Nanking. (In Chinese with English summary.) *Ent. & Phytopath.* 5(14) :262-273, 10 fig.,

1937.—*P. guttata* became rapidly more abundant on rice in the Provinces of Kiangsu, Chekiang and Anhwei in 1936. The results are here given of the authors' investigations on it, together with some conclusions arrived at by other workers. In the Nanking section, 4 larval and 9 pupal parasites were observed, the most abundant of the latter being a new species of *Pleurotropis*. Parasitism of pupae was so high in the autumn of 1936 that only 18.81% emerged. Each individual rolled up 3-12 leaves, the average number being 6.31. The average number of nests made on rice leaves was 79.15 per 100 hills. In 110 adults dissected, the percentage of males was 52.73. Late rice was most severely damaged, especially late varieties of *indica*. In addition to rice, 9 common plants, of which 8 are graminaceous, were attacked.

FROM REV. APPL. ENT.

Tsoong, P. C. Preliminary study of Chinese Campanulaceae (中國桔梗科植物之初步研究). *Contr. Inst. Bot. Nat. Acad. Peiping* 3(8):61-118, 13 pl., 17 text figs., 1935.—The author describes in considerable detail 13 genera of the Campanulaceae, including *Lobelia* and *Pratia* which by many authors are now segregated in the Lobeliaceae, and 91 species in addition to many varieties. Among these are 5 new species, *Adenophora longisepala* (Szechwan), *A. permila* (Hsiakang), *Codonopsis argentea* (Kweichow), *A. cordifolioidea* (Yunnan), and *Cyananthus pseudo-inflatus* (Hsiakang) and a single new variety, *Adenophora scabridula* Nannf. var. *viscosa* from Hopci. The variety does not have a Latin description, only a short comparison in English. There is a key to the genera but none to the species. The plates and drawings are excellent. The distribution of the species in southeastern China is rather incomplete. The paper does represent a distinct contribution to our knowledge of this interesting family. The paper is in English but there are additional notes in Chinese. F. P. METCALF

Tsuru, M. On the C-N ration in buckwheat. (In Japanese with English title.) *Formosan Agri. Rev.* 370:755-771, 8 tab., 7 graphs, 1937.

Tu, Chih, and Li, H. W. Breeding millet resistant to smut in North China. *Phytopathology* 15(6):648-649, 1 tab., 1935.—Millet, *Chætochloa italicica* Scribn., is next to wheat as a food crop in North China where some 28 billion lbs are annually produced on something over 22 million acres. A very important disease of millet in China is kernel smut, caused by *Ustilago oryzae* Korn. A series of experiments carried on by the authors indicated great differences in susceptibility among the selections, the percentage of infection ranging from nothing to 87%. The data warrant the view that one important procedure in combatting this disease consists of selection within a variety in order to develop smut-resistant strains. These selections should be made of millet already adapted to the area in which the selections are made.

W. E. H.

Uchida, Toichi. D.e von Herrn O. Piel gesammelten chinesischen Ichneumonidenarten. *Insecta Matsum.* 11(3):81-95, 8 fig., 1937.—About 28 species and forms from China, including 2 new genera and 12 new species and forms, are treated. Most of the specimens came from Kuling. W. E. H.

Uchida, Toichi. Erster Nachtrag zur Ichneumonidenfauna der Kurilen (Subfam. Ichneumoninae). *Insecta Matsum.* 10(4):135-146, 2 text fig.: (Subfam. Cryptinae und Pimplinae). *Ibid.* 11(1-2):39-55, 1936.—About 79 species, of which 17 species and varieties are new, are included. *Spilichneumon oratorius* (Fabr.), *Idiolispes obfuscator* Villers f. *magra* Uchida, *Deuteracorides albatarsus* (Gravenhorst) f. *orientalis* (Uchida), *Ephialtes manifestator* (L.) f. *hokkaidensis* Uchida, *Eparus persimilis* Ashmead, and *Apechthis capulifera* (Kriechbaumer) are from Korea and the last named is also from China. W. E. H.

Uchida, Toichi. Zur Ichneumonidenfauna von Tosa (II) Subfam. Cryptinae. *Insecta Matsum.* 11(1-2):1-20, 4 fig., 1936.—Several new genera

and species are described in this list of 95 species of which the following are also from Korea : *Aceroricnus ambulator* (Smith) (also from China, Manchuria, and Formosa), *Endrus flavofasciatus* (Uchida) f. *nigrinotum* new form (also from Formosa), *Spilocryptus japonicus* Uchida, *Exolytus laevigatus* (Graven.) f. *kiushuensis* Uch. (also from Formosa). *Plectocryptus albibasalis* Uch., and *Chasmocryptus hokkaidensis* (Uch.).

W. E. H.

van der Meer, J. C. Overzicht van de voor de Tabaks cultuur schadelijke, ongewervelde dieren. *Bull. Deli Proefstation*, No. 35, p. 1-44, 1 map, 2 tab., 1935.—In this list 427 invertebrate pests of the tobacco plant are mentioned and 33 of cured tobacco. From Formosa are listed 6 Orthoptera, *Thripa tabaci* Lind., 2 Hemiptera, *Myzus persicae* Sulz., 3 Lepidoptera, and *Lasioderma sericeorne* F.; *Dolycoris baccarum* L., *Sericinus* sp., and 2 Lepidoptera are from Korea; 2 Coleoptera and 10 Lepidoptera, from Indo-China.

Voss, Eduard. Monographie der Rhynchitinen-Trigus *Auletini*. III Teil. der Monographie der Rhynchitinae-Pterocolinae. *Stett. Ent. Zeit.* 97(2):279-289, 1937.—*Dicranognathus nebulosus* Redhb. is reported from Yunnan

Voss, Eduard. Monographie der Rhynchitinen-Trigus *Rhynchitini*. 2 Gattungsgruppe. *Rhynchitina* V. 1. Teil der monographie der Rhynchitinae-Pterocolinae. *Koleopt. Rundsch.* 18(3-4):153-160, 4 text fig.; 18(5):161-189, 3 text fig., 1932; 19(1-2):25-56, 13 text fig., 1933.—Of the 7 genera discussed, species of *Laetorrhynchites* Jek. have been recorded from Formosa, of *Coenorrhinus* Thoms. from Asia.

Voss, Eduard. Nachtragliches über paläarktische Arten der Subfamilie Rhynchitinae (Col. Curc.). *Koleopt. Rundsch.* 19(3-4):134-138, 1933.—*Byctiscus impressus* Fairm. *tibetana* n. form is described from Tibet.

Wang, Chung-nie, 汪仲毅 Index to Chinese Entomology (1935) No. 3. *Insekt. Interesa* 2(11):23-30, 1937.—This appears to be a third installment of this work but there is no indication where the earlier parts appeared. The present part is a list of references relating to Chinese insects and appearing in 1935. Most of the references refer to articles written in Chinese. W.E.H.

Wang, F. T., and Tang, T. Notes on Chinese Libaceae III. *Bull. Fan. Mem. Inst. Biol. (Bot.)* 7(2):81-90, 1936.—The authors describe the following new species: *Ipsilandia alpina* (Tibet & Burma), *Chionographis koreana* (Korea), *Aletris Dielsi* (Szechwan), *Peltosanthus tonkinensis* (Tonkin), *Polygonatum mengtense* (Yunnan), *P. tessellatum* (Burma), *Tupistra ensifolia* (Yunnan), *Smilax lunglingensis* (Yunnan), and *Heterosmilax Tsaii* (Yunnan). *Aletris brachyphyllus* (Merrill) Wang & Tang [*Lirope brachyphylla* Merrill] is the only new combination. A single new name is proposed: *Polygonatum Sino-Mairei* Wang and Tang [*Disporopsis Mairei* Lev., non *P. Mairei* Lev.]. A summary in Chinese is appended. F. P. METCALF

Wang, Ting-ding, 王鼎定. Morphological studies of penis of certain dragonflies. (In Chinese with title also in English) *Insekt. Interesa* 2(11): 1-4, 1 pl., 1937.—This is a technical discussion of the male genital organ in *Sympetrum* based in part on the literature and in part on the author's own observations. Y. W. DJOU

Wardlaw, C. W. Tropical fruits and vegetables. An account of their storage and transport. *Tropical Agriculture* 14(10):288-298, 1937.—The following fruits and vegetables are treated: persimmon (*Diospyros kaki*), pineapple (*Ananas sativus*), pomegranate (*Punica granatum*) potato (*Solanum tuberosum*), and salsify (*Tragopogon porrifolus*). References are included under each heading.

Ware, J. O. Plant breeding and the cotton industry. In U. S. Dept. Agri. Yearbook of Agriculture, 1936, p. 657-744, 26 fig., 1936.—A discussion of cotton breeding in the U.S. and in foreign countries, this article gives much valuable information in a non-technical style. Cotton breeding in China is discussed on pages 719-720 and on page 730. W. E. H.

Watanabe, C. A preliminary revision of the genus *Spinaria* Brulle (Hymen., Braconidae). *Insecta Matsum.* 11(3):106-117, 1 fig., 1 tab., 1937.—Thirteen species and several varieties are listed. There is a table showing distribution and there is an indication of species unknown to the writer and also species referable to other genera. The only species in the list known to occur in China is *Spinaria fuscipennis* Brulle. W. E. H.

Wats, R. C., and Singh, Jaswant. An investigation into the mosquitoicidal value of indigenous derris and other drugs. *Rec. Malaria Surv. India* 7(1):109-114, 1 tab., 1937.—The authors present in a table the results of tests they have made of the alcoholic extracts of fifteen plants, the ethereal extracts of sixteen plants, and chloroform extracts of six plants. The plants studied were, for the most part, those which have been used as fish poisons. The experiments indicate that insecticidal and piscicidal values do not go hand in hand. The results in all cases were found to be much inferior to those secured by the use of standard mosquitoicide (1 cc. of 1% solution of Pyrocide 20 in kerosene). The plants investigated include three species of Derris. W. E. H.

Watt, J. Y. C. Incidence of helminthic parasites with special reference to the epidemiology of *Fasciolopsis buski* in Shao-shan, Chekiang 1934-35. *Chinese Med. Jour.* 51(1):77-84, 4 tab., 1 map, 1937.—A survey of the helminth parasites of 1120 villagers out of a population of from 8000 to 10,000 in Shanghu (Shao-shan), Chekiang was made in 1934-35. Incidence of helminth infection is as follows: *Ascaris* 38.04%, hookworm 0.89%, *Trichuris* 12.32% and *Fasciolopsis* 83.84%. Incidence of fasciolopsiasis varied according to sex and age; in male children, 91.6%; in female children, 83.81%; and adults, 69.22%. Metacercaria of *F. buski* have been found on a native plant *Zizania aquatica* as well as on the skin of water-chestnuts and caltrops. No *F. buski* was found in dogs, cats, or pigs. AUTHOR'S SUMMARY

Wehrli, E. Über alte und neue Genera, Subgenera, Species und Subspecies (Lep. Geom.). *Ent. Runds* 54(46):562-563, 1937.—*Pseudopanthera chrysopteryx* sp. n. is from Tibet. The new genus *Devenilia* is described, with the genotype *D. corearia* Leech, from Ussuri, Korea, China, N. India and Formosa. *Spinuncina* is a new subgenus in *Lithina*.

Wetmore, A. Report on the progress and condition of the United States National Museum for the year ended June 30, 1935. 121 p., 1936 (rec'd Sept., 1937).—This annual report is divided into four parts as follows: Operations for the year, reports on the collections, list of accessions, list of publications. Under the first heading are included various items such as appropriations, visitors, buildings and equipment, etc. The reports on the collections are arranged by departments. Since the administrative problems of museums are much the same the world over and since the National Museum collections contain specimens from all parts of the world, this report is of interest to scientists and museum administrators in various parts of the world. W. E. H.

Wiley, Grace O. Taming King Cobras. *Natural History* 39(1):60-63, 1937.—This very interesting and informative article tells, largely in diary form, of the author's experience in taming two large specimens of the King Cobra (*Naja hannah*). The paraphernalia used consisted of a three-foot stick with a heavy U-shaped wire at one end, and another stick of the same length with one end padded with soft cloth. The former was used to gently push the snake back, if they attempted to strike or rush out of the cage. The

latter was used to gently pat the snakes. The snakes soon responded to this gentle treatment. The author found that the cobra, as well as about two dozen other species of poisonous snakes with which she has worked, is not afraid to trust you. By careful manipulation, one can soon gain their confidence. It is necessary for the operator to be unafraid, to make quiet, deliberate movements, and to remain perfectly still, or hurriedly retire if anything unexpected happens. The reviewer has had the pleasure of seeing the author engaged in this kind of work, and has nothing but praise to give for her ability and fearlessness.

W. E. H.

Wilson, Stanley D., Chao, Yun-Ts'ung, and Chu, Jen-Fei. Saponins I: the toxic principle of "ch'a tzu" (茶仔) a fish poison from south China. *Peking Nat. Hist. Bull.* 11(4):367-371, 2 tab., 1937.—The toxic property of the seeds of *Camellia* is entirely due to a saponin. Dry heat destroys the toxic nature of the saponin. Chemical derivatives of the saponin are without toxic effect. The saponin is about one-fiftieth as toxic as rotenone to gold fish. The larvae of the sawfly, the tent caterpillar and silk worms refuse to eat leaves with the saponin on them.

AUTHORS' CONCLUSION

Wong, K. Y., 黃啟元. Experiments on the prevention of egg-laying of *Melanauster chinensis* For. (In Chinese with English title.) *Prob. of Insects* 2(7):121-124, 1937.—Use of the coir or fibrous material from the leaf bases of certain palms for wrapping around the base of the tree for a distance of one foot above the ground is recommended as one of the best methods for the prevention of egg-laying of *M. chinensis* For.

Y. C. Ng

Wu, Chen-Chung. 奧振鐘. A study of control measures of cotton aphids, *Aphis gossypii* Glover. (In Chinese with English summary) *Central Cotton Improvement Institute, Nanking, 1-86, 11 fig.*, 1937. [Reprinted from *Cotton Monthly* 1(4,5,6).]—This paper deals largely with work carried out by the author in connection with his duties at the Central Cotton Improvement Institute of the National Economic Council. The main topics are distribution, life history, causes of outbreaks and control measures. The latter includes the author's experience in extension work in Hopei Province. It is stated that the cotton aphid, *Aphis gossypii* Glover, is the most serious insect pest of cotton in North China where it is particularly injurious to American varieties. The loss to cotton for the whole of China caused by aphids during 1936 is estimated at one hundred million dollars national currency. Dry weather favours the development of this insect. Infestation usually spreads from the villages, so the first control measures should be carried out in the villages. The best and cheapest contact insecticide is the soap stock, the second best is the cotton seed oil emulsion, while tobacco extract is the third. Soap stock is a by-product of the cotton seed oil obtained by treating cotton seed oil with caustic soda solution. Soap stock costs about \$2.00 per 100 kg. It kills 91% of the aphids even when diluted 120 times with water. Excluding labor, it costs only 1 ct. to control the aphids on one mow of cotton. In the use of cotton seed oil emulsion the author succeeded in preparing a dilution which contains only 3% cotton seed oil without reducing its effectiveness. The cost was thus reduced from 46 cts. to 10 cts. per mow. The formula is as follows: Water, 15,000 cc.; soda ash (Na_2CO_3), 47 g.; soap, 31 g.; cotton seed oil, 47 cc. Thirty minutes later, the soap solution is added. Then the cotton seed oil is added, a little at a time, thoroughly stirring the mixture as it is added. Instead of spraying, the author found dipping to be an effective way of applying insecticides. The insecticide is placed in a container, such as a basin, and the young plants bent over and immersed in the insecticide. In using the author's insecticide and methods of application, the Ting Hsien Cotton Experiment Station increased the production of 15,000 mow of cotton by \$150,000 national currency, while the cost of the insecticide was only a little more than \$6,000.

W. E. H.

Wu, Choa-fa, 武兆發. Notes on the preparation of sections of the uteri of *Ascaris megalocephala* for the demonstration of the maturation and fertilization phenomena in animals. *Peking Nat. Hist. Bull.* 11(3) : 249-251, 1937.—Detailed technique for the preparation of sections of the uteri of *A. megalocephala* for class use is outlined. H. T. CHEN

Wu, F. C., 吳方城. [Notes on *Agrotis (Rhyacia) ypsilon* Rott.] (In Chinese.) *Insekto Interesa* 2(7-9) : 65-74, 2 tab., 1936 [Rec'd Apr. 1937].—The author reviews the studies of the cut-worm by different Chinese workers. The material for the present paper is largely taken from the results of earlier workers. *Agrotis (Rhyacia) ypsilon* Rott. attacks not only cotton; it has been reported as a pest of 46 species of plants belonging to 21 families. Notes on distribution, external morphology of the different stages, habit, life history, and control methods are given. Y. C. NG

Wu, H. C., 吳宏吉. Synoptic table for the identification of the mature larvae of the Chinese important cotton insects (In Chinese with English title.) *Insekto Interesa* 2(7-9) : 21-25, 1936 [Rec'd Apr. 1937].—The larval characters used for classification and a key to the important Chinese cotton insects are given. Y. C. NG

Wu, Hong-che, and Hwang, Chung-chiang, 吳宏吉, 黃中強. The preliminary observations on the life history of *Atractomorpha sinensis* Bol. (In Chinese with English title.) *Insekto Interesa* 2(7-9) : 31-44, 8 tab., 1936 [Rec'd Apr. 1937].—*Atractomorpha sinensis* Bol. is one of the cotton leaf pests. Besides cotton 45 other species of plants are infested. There are two generations a year; hibernation occurs in the egg stage. The duration of the incubation period of the first generation is about 25 days; for the second generation about 7 months. The first instar nymphs of two generations appear in May and July, respectively. In the first generation it takes 52.4 days on the average to complete its nymphal life; in the second generation the average duration of the nymphal life is 94.47 days. The longevity of the adults of the first generation is longer than that of the second generation; in both generations, the females last slightly longer than the males, varying from 41.2 to 51.36 days (average). A female can lay about 313 eggs; there are about 50 in a mass. The distribution, injurious status, habit, hatching, molting, mating habit, and control measures of *A. sinensis* are given; the different stages are described. Y. C. NG

Wu, H. W., and Hu, T. P. On the intestinal worms of goats in Nanking. *Sinensis* 6(6) : 398-700, 1 tab., 1935 [1936].—This paper is based on a study of ten goats, age one to five years, from the Nanking area. The three species of Nematodes and the one species of Trematode are all cosmopolitan. Measurements given for the species were as follows: *Paramphistomum cervi* (Shrank), *Haemonchus contortus* (Rudolphi), *Oesophagostomum venulosum* (Rudolphi), and *Trichuris ovis* (Abildgaard). W. E. H.

Wu, Kuang. Helminthic fauna in vertebrates of Hangchow area. *Peking Nat. Hist. Bull.* 12(1) : 1-8, 1937.—The hosts examined comprised 127 animals distributed as follows: 60 cats, 20 dogs, 10 oxen, 10 rats, 10 fishes, 5 hogs, 5 ducks, 5 frogs, and 2 leopards. Observations of human helminths were also included. Among the helminths listed in the paper worth noting here are *Hymenolepis nana* from a single patient, *Diectophyme reliae* from the kidney of a dog, *Fasciola gigantica* and *Schistosoma japonicum* from oxen, *Isoporocheilus hypselobagri* from the swim bladder of *Parasururus asotus*, *Schistosoma japonicum* from cats, *Fasciolopsis buski* from pigs and *Bilharziella* from ducks. H. T. CHEN

Wu, Kuang. Susceptibility of various mammals to experimental infection with *Fasciolopsis buskii* (Trematoda: Fasciolidae). *Ann. Trop. Med. & Parasit.* 31(3) : 361-372, 2 pl., 1 tab., 1937.—12 species of animals were used for experimental infection. In 6 pigs used practically all

specimens of *Fasciolopsis buski* developed to maturity. The worms remained immature in all 4 dogs. In the 6 rabbits used both immature and mature stages of the worm were met with. Immature worms were also noted in a young buffalo, which died before the worms could have reached maturity. The remaining animals, including one monkey, 4 cats, one sheep, one goat, one ox, 5 guinea pigs, 5 albino rats and 10 mice, appeared resistant to *Fasciolopsis* infection.

H. T. CHEN

Wu, Lien-teh. The new medicine and its impact on old-style Chinese medical practice. *The Caduceus* 16(1) :1-15, 1937.—Briefly reviewing early medical practice in south China by way of introduction the author proceeds with his subject by dividing it into topics such as anatomy, surgery, eye diseases, pulse-lore, physical therapy, infectious diseases, and hygiene. In reality a comparison is made between the ancient and present methods of treating various diseases and a careful interpretation of the facts made. The regional distribution of physicians in China is discussed and a system of State Medicine is strongly advocated.

W. E. H.

Wu, Shih-cheng, 吳希澄. A preliminary list of Chinese Culicidae, Diptera. *Insekto Interesa* 2(10) :1-12, 1937.—Ninety-two species and varieties are listed. The author and the year are given but not the citation. The localities (towns) are listed alphabetically without reference to provinces.

W. E. H.

Wu, Y. C. Über die Gattung *Stauntonia* DC. *Notizblatt Bot. Gart.*, Mus. Berlin-Dahlem 13(118) :364-376, 1936.—There is a systematic review of the genus and a key to species. Two species are from Yunnan, 6 species and the forms *S. heraphylla* f. *urophylli* (Hand.-Mzt.) n. comb., and *S. h. f. intermedia* n. f. are from Kwangtung; 1 species is from S. China; 2 from Kiangsi; 3 species including *S. leucantha* Diels nov. spec. and *S. Djelsiana* nov. spec. are from Kwangsi; 2 species and the new form *S. heraphylla* f. *typica* Wun are from Hong Kong; 3 species and the new variety *S. hebaudi* var. *angustata* are from Formosa; 2 species are from Fukien; there is 1 each from Hainan, Hupeh, Kweichow, Indochnia and Hunan.

Yamagishi, K. Some notes on the rice bran and its utility. (In Japanese with English title.) *Formosan Agric. Rev.* 369 :611-631, 22 tab., 1937.

Yanagihara, M. Control methods for *Melanaustra chinensis* Forst., a pest of *Casuarina equisetifolia*. (In Japanese) *Jour. Formosan Sug. Plant. Assn.* 15(2) :23-26, 1937.—The Lamid, *M. chinensis*, attacks and sometimes kills *Casuarina equisetifolia*, which is widely planted in Formosa as a windbreak and to prevent sand-drift. It is frequently found near villages and sand-hills where *Melia azedarach* and *Broussonetia papyrifera*, other favoured food-plants, are cultivated. The adults are most abundant from April to June, but can be found till October. Each female lays about 7-80 eggs singly in the basal parts of the stems. The larvae hatch in 7-10 days and require about a year for development; the pupal stage lasts 10-15 days. Methods suggested for control include removal of alternative food-plants growing near *C. equisetifolia* and some of the measures employed against this Lamid on Citrus.

FROM REV. APPL. ENT.

Yang, We-I. The distribution of Chinese insects as shown in the families of Plataspidae, Pentatomidae, Urostyliidae, Cydnidae, and some other families. *Peking Nat. Hist. Bull.* 11(4) :309-320, 1 col. map, 1937.—This article is interesting if for no other reason than that it may serve to stimulate interest in a much neglected group of insects. The author divides China into five distributional areas as follows: Oriental, Palearctic, Neutral, Central Asiatic, and Tibetan and shows these areas on a coloured map. The

idea of designating one area as Neutral is rather novel especially since one of the reasons for so doing is, apparently, the fact that not much material from this region is available for study. In the reviewer's opinion the present paper does not tell us much. The reasons for this view are: the Scutelleroidea of China are too little known to enable an adequate discussion of distribution; the paper speaks very largely in terms of percentages without giving the names of the genera or species involved, thus making it practically impossible to use the present paper as a basis for further discussion when our knowledge of distribution becomes more extensive as a result of further collecting and especially when material now extant is correctly determined. The species involved could have been shown in tabular form requiring but little additional space. One is also left to conjecture on what basis references were included in the bibliography. Eight references by the writer of the article are included while many references of equal importance (and of equal accessibility) were omitted.

W. E. H

Yu, C. T., 尤其偉. The brief observations on life history of *Colomycterus* sp. (In Chinese with English title.) *Insekto Interesa* 2(7-9):50-53, 1 tab., 1936 [Rec'd Apr. 1937].—*Colomycterus* sp. is one of the cotton pests; there is only one generation a year. It requires from three to four months to complete its development. The insects appear from May to August. The duration of the incubation period varies from 7 to 8 days. The larvae are abundant in July and August. Pupation takes place during the first ten days of October. The adults emerge during the last twenty days of October. The different stages are described; their habits and control methods are briefly mentioned.

Y. C. NG

Yu, C. T., 尤其偉. Further notes on life history of cotton caterpillar (In Chinese with English title.) *Insekto Interesa* 2(7-9):54-64, 11 tab., 1936 [Rec'd Apr. 1937].—The cotton caterpillar appears twice a year. There are 6 or 7 instars of those hatched in July, but those hatched at the end of August molt eight times. The durations of the different stadia and of the pupal stage, and the longevity of the adult of the first and second generations are given in the tables. It requires about 58 days to complete the life history in the first generation. In the first generation a female can lay 755 eggs but a female of the second generation deposits 1712 eggs. Characters used to classify the male and female, habit of the adult, detailed description of the caterpillar, etc., are given. Brief notes on the control method as well as its natural enemies are included.

Y. C. NG

Yu, T. Swett, 尤其偉. Preliminary studies on external morphology and taxonomy of the imagoes of the cotton-insects. (In Chinese with English title.) *Insekto Interesa* 2(7-9):1-20, 1936.—A review of cotton insects of the world as well as China is given in the introduction to this article. A list of 41 important species of Chinese cotton insects and a species of spider, and notes on external morphology based on these 42 species are given; a key to 42 Chinese species is included.

Y. C. NG

Yu, T. Swett, and Wang, K. F., 尤其偉, 汪桂芳. Comparative study on "close-room control" and "sun ray control" for Pink Boll-worm. (In Chinese with English title.) *Insekto Interesa* 2(7-9):43-49, 4 tab., 1936 [Rec'd Apr. 1937].—A very brief account of the distribution and damage done by Pink Boll-worm are mentioned. As to the control, the "close-room control" is more effective than the "sun-ray control". In order to eliminate all the caterpillars from infested cotton it takes 10 days by using the "sun-ray control" but it only takes 7 days if the "close-room control" is applied. The effectiveness is directly proportional to the temperature during the application.

Y. C. NG

Zumpt, F. Bestimmungstabellen der Subgenera *Dorytomus* s. str. und *Paradorytomus* Zpt nebst Beschreibungen neuer paläarktischer

Arten. (Curculioniden-Studien VIII.) *Koleopt. Runds.* 19(3-4) :81-105, 7 fig., 1933.—Included *etie P. mongolicus* Zpt. from Mongolia and *P. peneckei* n. sp. from Manchuria.

Zumpt, F. Curculioniden-Studien III. Neue Russelkafer aus dem Japanischen Reich und Bemerkungen zu einigen *Hylobius*- (*Pagiophloeus*-) Arten. *Koleopt. Runds.* 18(3-4) : 126-135. 4 text fig., 1932.—*H. perforatus* Roel. and *H. orientalis* Motsch. are listed from China; *H. o. formosanus* n. subsp. from Formosa.

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LINGNAN SCIENCE JOURNAL

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STUDIES ON THE MARINE CHLOROPHYCEAE FROM HAINAN, II¹

By C. K. TSENG (曾呈鑒)

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In the first instalment of the present paper (Tseng, 1936a), 38 species of marine green algae were reported from the island of Hainan. In an earlier paper (Tseng, 1935), two species were mentioned and quite recently (Tseng, 1936b and 1937), two more were credited to the same region. Thus, there are 42 species of this group of plants already known from this island. Since then a few more of this group of algae have been studied, the results of which study are presented in this report.

CHAETOPHORACEAE

Ulvella Crouan (1859)

Ulvella Lens Crouan

Notice sur quelques algues mar., p. 288, pl. 22, fig. E, 1859; Collins, Green Algae N. Amer., p. 286, 1909; Set. & Gard., Mar. Algae Pac. Coast N. Amer., pt. 2, Chlorophyc., p. 295, pl. 33, 1920.

This is found epiphytic on the older segments of *Chaetomorpha antennina* (Bory) Kuetz. occurring as orbicular, bright green disks. Cells in the central part are more roundish and larger, about 6-8 μ diam., while the outer ones are more elongated, usually forked and smaller, about 3-5 μ diam. and 12-16 μ long.

HABITAT: On *Chaetomorpha antennina* (Bory) Kuetz., Ying-ke-hai, in April (Tseng 944a).

CHINA: A new record.

DISTRIBUTION: Widely distributed.

ULVACEAE

Enteromerpha Link (1820)

Members of this genus are quite well represented in the marine flora of this region. One of these, *E. tubulosa* Kuetz., was mentioned

¹ Contribution No. 11 from the Marine Biological Laboratory, Department of Biology, National University of Shantung

in a previous paper (Tseng, 1935). In the present report, two more are to be added:

- | | |
|--|---------------------|
| A. Plants simple | E. <i>flexuosa</i> |
| AA. Plants with proliferous branches | E. <i>prolifera</i> |

Enteromorpha flexuosa (Wulf.) J. Ag.

Till Alg. Syst. III, p. 126, 1883.

Conferra flexuosa Wulf., in Roth, "Cat. Bot II," p. 188, 1800

The thallus is simple and tubular, cylindrical and smaller downwards, gradually increasing upwards, becoming inflated and flexuous. In surface view, cells are rectangular or polygonal, more or less longitudinally arranged, about 8-16 μ diam. The membrane is about 20-24 μ thick, with thicker inner walls about 7-8 μ thick. This species is very common on the Hainan coast. It is easily distinguished from *E. tubulosa* Kuetz., which is also simple and tubular, by its less distinctly longitudinally arranged cells and its inflated upper portion of the thallus.

HABITAT: On rocks and in rock pools in the upper littoral belt. Kuan-nan, Wenchang, in March (*Tseng* 712, 716); Fung-chia Kang, Ch'itung-tung, in March (*Tseng* 732); Seven Stones, Po-ngau Kang, Loh-hwei, in December (*Tseng* 1817); Sin-ts'un Kang, Lengshui, in April (*Tseng* 817); Sama, Yai Hsien, in January: West I. (*Tseng* 2309) and East I. (*Tseng* 2362); Ying-ke-hai, Yai Hsien, in February (*Tseng* 2445) and April (*Tseng* 896); Ch'angchiang, in May (*Tseng* 992); and Baklo, Kan-en, in May (*Tseng* 1001).

CHINA: A new record.

DISTRIBUTION: Widely distributed in warmer seas.

Enteromorpha prolifera (Muell.) J. Ag.

Till Alg. Syst. III, p. 129, pl. 4, fig. 103-104, 1883.

Ura prolifera Mueller, in "Fl. Dan.," vol. 5, fasc. 13, pl. 763, fig. 1, 1778.

This is similar to the above species, as well as to *E. tubulosa* Kuetz., in the tubular fronds with more or less longitudinally arranged cells. It differs from them, however, in that its fronds are beset with simple, proliferous branches.

HABITAT: Floating in quiet waters in sheltered places. Hoi-how, in March (*Tseng* 683, 684); Po-ngau Kang, Loh-hwei, in June (*Tseng* 1100); Kang-pei Kang, Wen-ning, in June (*Tseng* 1074).

CHINA: Peitaiho (Collins, 1919); Chefoo (Howe, 1924); Tsingtao (Howe, 1934; Tseng and Li, 1935); Amoy (Tseng 1936a).

DISTRIBUTION: Widely distributed.

BOODLEACEAE

Cladophoropsis Borgesen (1905)

Cladophoropsis fasciculata (Kjellm.) Borgesen (fig. 1)

Contr. connais. gen. *Siphonocladus*, p. 288, 1905; Okamura, Icon. Jap. Alg. 4(4):75, pl. 169, fig. 1-7, 1921.

Siphonocladus fasciculatus Kjellm., Mar. Chlorophyc. Japan, p. 36, pl. 7, fig. 10-17, 1897.

There is only a single specimen referable to the present species. It is a much more rigid and coarse plant than *C. sundanensis* Rbd., the only one of this genus reported from this region. The filaments are mostly 200-300 μ diam., excluding the rhizoidal

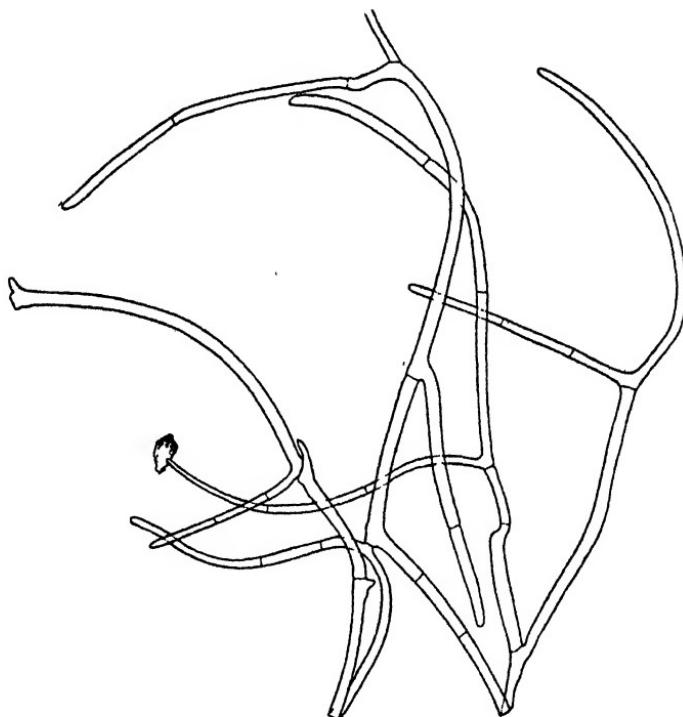


Fig. 1. *Cladoproropsis fasciculata* (Kjellm.) Borg. Habit sketch $\times 8$.

branches. The cell walls are very thick, usually 10-20 μ . The ramification is very irregular, usually secund or alternate. Branches are often very patent and more or less curved. Root fibers are emitted from certain segments serving to keep the different filaments together.

HABITAT: Washed ashore, Po-nga Kang, Loh-hwei, in December (Tseng 1891).

CHINA: A new record.

DISTRIBUTION: Japan; Riukiu; Formosa.

CLADOPHORACEAE

Chaetomorpha Kuetzing (1845)**Chaetomorpha Linum** (Muell.) Kuetz.

Phyc. germ., p. 204, 1845; Hauck, Meeresalg., p. 439, 1885.

Confervaria Linum Muell., l. c., pl. 771, fig. 2.

From the five species of *Chaetomorpha* already reported (Tseng 1936a), this one is easily distinguished by its unattached, curled and crisped filaments with cells about $100\text{-}120 \mu$ diam., and 1-2 diameters long.

HABITAT: Entangled among other coarser seaweeds, Seven Stones, Po-ngaü Kang, Loh-hwei, in October (Tseng 2263).

CHINA: Amoy (Tseng, 1936a).

DISTRIBUTION: Widely distributed in warmer seas.

ANADYOMENACEAE

Anadyomene Lamouroux (1816)

In the first report, the occurrence of members of this genus was mentioned. I was not sure then if there were one or more species involved. With more materials available, I have finally arrived at the conclusion that all of the different numbers of the *Anadyomene* belong to the Japanese species, *A. Wrightii* Gray.

Anadyomene Wrightii Gray (fig. 2)

Jour. Bot., p. 48, pl. 44, fig. 5, 1866; J. Agardh, Till Alg. Syst. VIII, p. 124, 1884; Okamura, Icon. Jap. Alg. vol. 1, pl. 40, fig. 1-6, 1912.

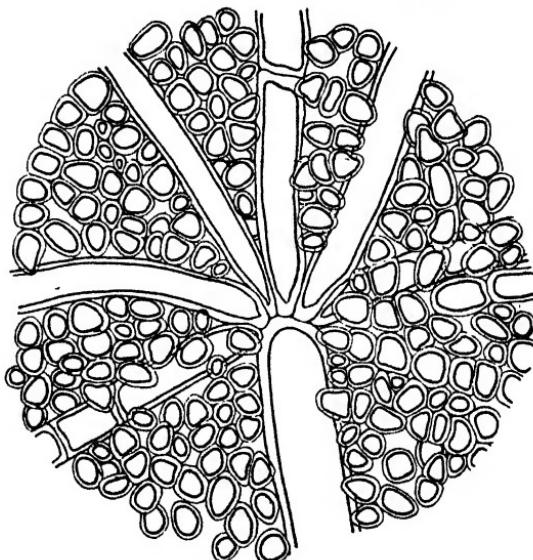


Fig. 2. *Anadyomene Wrightii* Gray. Surface view $\times 67$.

This beautiful plant has leaf-like fronds with conspicuous veins. The veins branch poly-chotomously, often 5-7 from the same point, so that a stellate branching results. The main veins are about $200\ \mu$ diam. and the upper, smaller ones about $100\ \mu$ diam. The cells are roundish or slightly angular, about $60-80\ \mu$ diam. Specimens on hand attain a height of 2-3 cm.

HABITAT: On coral chips in the lower littoral belt. Fung-chia Kan, Kiungtung, in March (*Tseng 741*); Tsing-lan Kang, Wenchang, in April (*Tseng 779*); Yu-ling Kang, Yai Hsien, in April (*Tseng 830*); West I., Sama, Yai Hsien, in January (*Tseng 2347*).

CHINA: A new record.

DISTRIBUTION: Riukiu Is.; Formosa; Bonin Is.; New Guinea.

CODIACEAE

Avrainvillea Decaisne (1842)

In the first report, the occurrence of two species of *Avrainvillea* was mentioned. Dr. Borgesen suggested that one of these, the commoner and larger species, might be *A. erecta* (Berk.) Gepp. I was rather doubtful about this identification at that time because of the smaller size of the frond filaments. Since then, more materials have been collected, showing that size varies very greatly. On the whole, the species seems to fall within the boundary of *A. erecta* as suggested by Dr. Borgesen. The other species, a much smaller one, is rather rare and was collected only once. A more careful study seems to place it within the limit of *A. lacerata* J. Agardh.

- A. Plant large, to 10 cm. broad and 6 cm. high; frond filaments large, $24-60\ \mu$ diam., not tapering *A. erecta*
- AA. Plant small, to 1.5 cm. broad and 2 cm. high; frond filaments small, about $6-25\ \mu$ diam., tapering *A. lacerata*

Avrainvillea erecta (Berk.) A. et E. S. Gepp (fig. 3)

Codiac. Siboga Exp., p. 29, pl. 9-10, fig. 84-89, 1911; Yamada, Mar. Chlorophyc. Ryukyu, p. 73, fig. 41, 1934

Dichonema erectum Berkeley, in "Hooker's London Jour. Bot. I," p. 157, pl. 7, fig. 11, 1842.

Avrainvillea papuana Murray & Boddle, Syst. Struct. Acc. *Avrainvillea*, p. 71, pl. 289, 1889; Heydrich, Ein. Alg. von Loochoo Ins., p. 101, 1907.

This plant is solitary, very shortly stalked, attached to the substratum by means of an elongated, densely interwoven mass of rhizoids. The flabellum is thin, reniform, entire or fimbriate, attaining a breadth of 10 cm. and a height of 6 cm. The frond filaments are yellowish-brown in color, cylindric, not tapering, about $24-60\ \mu$ diam. The angle of the dichotomy is rather wide. In one of the field numbers (*Tseng 414*), the specimens have much smaller frond filaments, measuring only about $24-35\ \mu$ diam. The other characteristics are, however, entirely those of the present species and so it is also grouped here.

HABITAT: On sandy mud, in the littoral belt, in sheltered places. Wenchang, in June: Kuan-nan (*Tseng* 414) and Tsing-lan Kang (*Tseng* 1108); Sing-ts'un Kang, Lengshui, in May (*Tseng* 1054); Yen-ts'un, Kiungtung, in October (*Tseng* 2246).

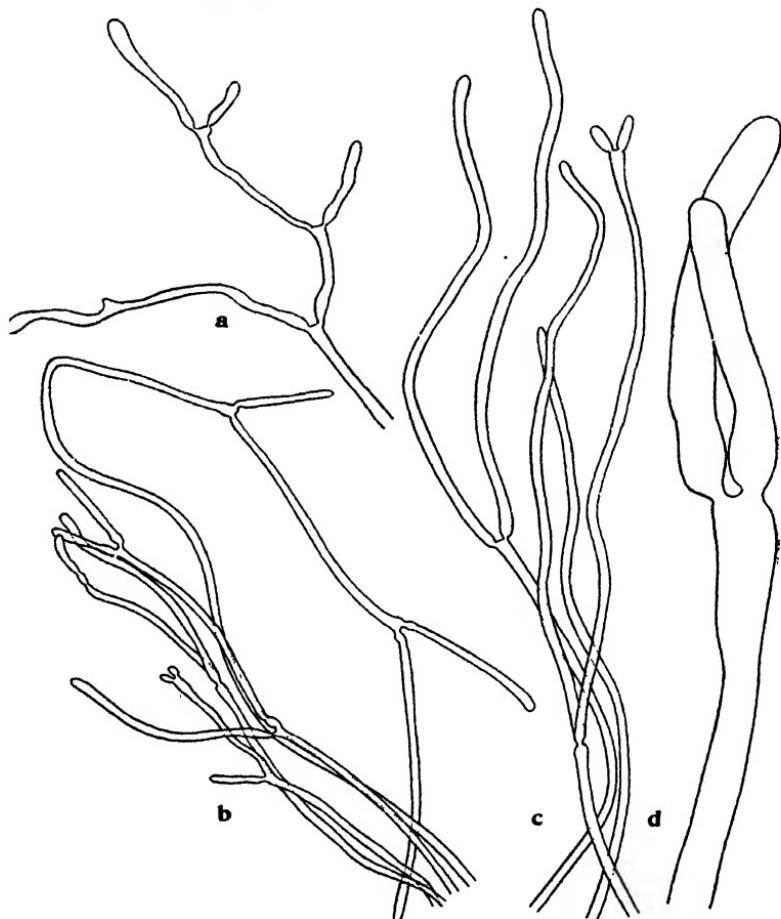


Fig. 3. *Avrainvillea erecta* (Berk.) Gepp. Frond filaments: a, from Tsing-lan Kang $\times 44$; b, from Kuan-nan $\times 44$; c, from Sing-ts'un Kang $\times 44$; d, the same $\times 220$

CHINA: A new record.

DISTRIBUTION: Widely distributed on the tropical coasts of Indo-Pacific regions, "from Madras to New Guinea" (Gepp, l.c.).

Avrainvillea lacerata J. Agardh (fig. 4)

Till Alg. Syst. V, p. 54, 1887; A. & E. S. Gepp, l. c., p. 38, pl. 13, fig. 105-109.

There is only a single collecting number with a few specimens referred to this species. The thick rhizome bears a few crowded, small, thin frnds about 1-1.5 cm. broad and 1-2 cm. high, somewhat cuneate oblong to slightly cordate in shape and brownish-green in color. The margin is entire or fringed. The frond filaments are small and tapering, about $20-25 \mu$ diam. in the interior parts and

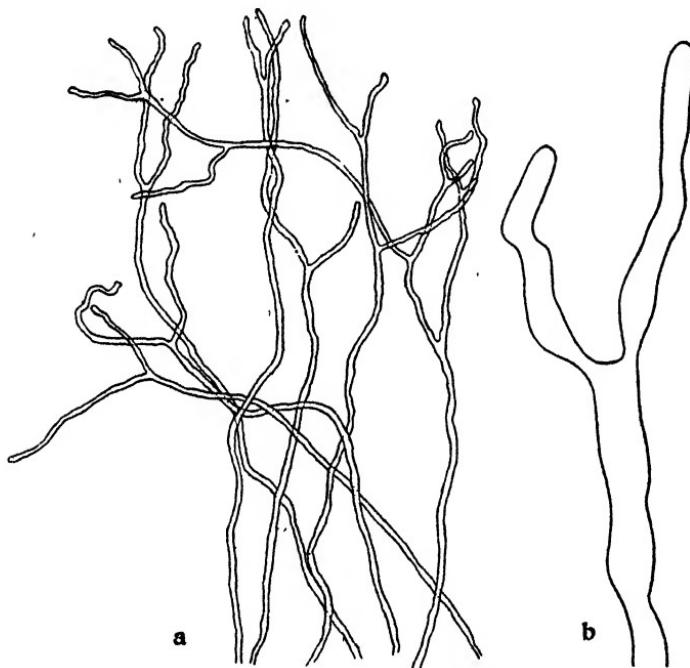


Fig. 4. *Avrainvillea lacerata* J. Ag. Frond filaments. a, $\times 44$; b, $\times 280$.

only $6-8 \mu$ in the peripheral, apical portions. They are cylindrical but here and there irregularly and sparsely torulose and tortuous, only slightly so in the inner part and more so for a short distance behind their apices. The supra-dichotomial constrictions are distinct and usually long-necked. Our specimens are young and immature, probably belonging to the var. *robustior* Gepp but resembling more the fig. 107 of Gepp's work, l.c.

HABITAT: In rock pools with sandy bottom, between tides. Ying-ke-hai, Yai Hsien, in May (Tseng 1901).

CHINA: A new record.

DISTRIBUTION: Singapore; Friendly Is.; Riukiu.

Codium Stackhouse (1795)**Codium coronatum** Setchell

Tahitian Alg., p. 82, pl. 10, fig. 2-5, pl. 11, fig. 2-3, pl. 12, fig. 1, 5; Börgesen, Some mar. alg. Ceylon, p. 67, 1936.

C. arabicum Tseng (not Kuetzing), Mar. Chlorophyc. Hainan, p. 167, fig. 26a.

When I referred the adherent *Codium* from Hainan to *C. arabicum*, I was not entirely without doubt. Having studied my specimen of this *Codium*, Dr. Börgesen kindly wrote me that my specimen is probably to be referred to *C. coronatum* Setch. He also enclosed a Ceylon specimen of this species for my comparison. Now, having studied my specimen more carefully and compared it with the Ceylon plant and the description of Setchell, I come to realize my mistake. Like the Tahitian and Ceylon plants, the Hainan plant has foliaceous and slightly inflated lobes. The utricles have thin walls, to 2-3 μ thick. Older utricles also have circles of hairs although younger ones are generally devoid of them.

CHINA: Hainan (Tseng, 1936b, sub *C. arabicum*).

DISTRIBUTION: Tahiti; Ceylon.

Codium Geppei Schmidt

Beitr. zur. Kenntn. Gatt. *Codium*, p. 50, 1923; Börgesen, l. c., p. 68, fig. 3.

C. divaricatum Gepp (not Holmes, 1895), Codiae. Siboga Exp., p. 136, pl. 22, fig. 195-199, 1911.

C. repens Tseng (not Creouan), l. c., p. 168, fig. 26d.

Dr. Börgesen also called my attention to the *Codium* which I named as *C. repens* in the same paper. He thought that my specimen was the same as his from Ceylon, which he identified as *C. Geppei*. A re-examination of my specimens and a comparison with Dr. Börgesen's plant and the descriptions of Gepp and Schmidt show that my plant comes nearer to the present species although it has somewhat longer utricles.

CHINA: Hainan (Tseng, 1936b, sub *C. repens*).

DISTRIBUTION: Malay Archipelago; Ceylon.

Literature Cited²**AGARDH, J. G.**

1883. Till Algernes systematik, Nya bidrag. *Lunds Univ. Årsskr.* Vol. 19.
1887. Till Algernes systematik, Nya bidrag. *Lunds Univ. Årsskr.* Vol. 23.

BÖRGESSEN F.

- 1905 Contributions la connaissance du genre *Siphonocladus* Schmitz.
Ext. Bull. Ann. Acad. Roy. Sci. Lett. Denn. No. 3:259-291.
1936. Some marine algae from Ceylon. *Ceylon Jour. Sci.* (A) 12(2): 57-96.

² Literature cited in the previous instalment will not be listed here.

KJELLMAN, F. R.

1897. Marina chlorophyceae from Japan. *Bih. till Kongl. Sv. Vet.-Akad., Handl.* 23.3(11) :1-44, pl. 1-7.

MURRAY, G., AND GOODL, L. A.

1889. A systematic and structural account of the genus *Avrainvillea*. *Jour. Bot.* 27 :67.

OKAMURA, K.

1908. Icones of Japanese Algae. Vol. 1, No. 8, Tokyo.

1921. Icones of Japanese Algae. Vol. 4, No. 4, Tokyo.

SETCHELL, W. A.

1926. Tahitian Algae collected by W. A. Setchell, C. B. Setchell and H. E. Parks. *Univ. Cal. Pub. Bot.* 12(4) :61-110, pl. 7-22.

TSENG, C. K.

1936a. Studies on the marine Chlorophyceae from Hainan. *Amoy Mar. Biol. Bull.* 1(5) .129-200, pl. 1

1936b. On marine algae new to China. *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(5) :169-196, pl. VI.

1937. On marine algae new to China II. *Bull. Fan. Mem. Inst. Biol. (Bot.)* 7(6) .231-255.

海南島海產綠藻的研究（二）

曾呈奎著

海南島之海產綠藻，經作者前後報告計四十二種。本文又增加八種，其中除兩種已經發現於我國其他海岸外，餘者均為我國之新記錄：*Uvella Lens* Crouan, *Enteromorpha flexuosa* (Wulf.) J. Ag., *Cladophoropsis fasciculata* (Kjellm.) Borg., *Anadyomenes Wrightii* Gray, *Avrainvillea erecta* (Berk.) Gepp, *Avrainvillea laccata* J. Ag.

**NEW LONGICORN BEETLES FROM CHINA, VI
(COLEOPTERA: CERAMBYCIDAE)¹**

By J. LINSLEY GRESSITT

*Insect Taxonomist, Lingnan Natural History Survey and
Museum, Lingnan University.*

This paper completes the report on a collection of Cerambycidae from Szechwan Province, West China, commenced in the preceding part of this series.² Herein are described one new species and one new subspecies, the types of which are in the United States National Museum in Washington, D. C., as are the other specimens, with the exception of duplicates retained in my own collection.

Subfamily **Prioninae**

Tribe **Philini**

Philus pallescens Bates

Philus pallescens Bates, Proc. Zool. Soc. London 1866 : 350 (Formosa).

A specimen was collected between Mowchow and Uen-chuan, Szechwan Province, by the Rev. D. C. Graham.

Subfamily **Cerambycinae**

Tribe **Asemini**

Tetropium orienum Gahan ?

Tetropium orienum Gahan, Faun. Brit. India, Col. 1 : 95, fig. 37, 1906 (W. Kashmir, NW. Himalayas).

A single specimen was collected at Yachow, altitude between 2,200 and 4,000 feet, Szechwan Prov., Aug. 25, 1930, by the Rev. D. C. Graham New to China.

The example measures 9.5 mm. in length and 2.8 mm. in breadth. The color is brownish-black on the head, prothorax and metasternum; the antennae, legs and abdomen are reddish-brown, the last named subtestaceous apically; the scutellum and external half of each elytron are dark reddish-brown, the inner portions of the elytra lighter brown. The head and prothorax are finely, but distinctly, punctured, and the disk of the latter has four feeble swellings forming a square, a narrow and slightly raised mid-longitudinal ridge behind middle and a preapical transverse furrow; the elytra are micropunctulate basally and microgranulose beyond base, largely clothed with sparse adpressed auburn hairs; the femora are short and very much broadened, being four times as wide as tibiae in each pair of legs.

¹ Contribution from Lingnan Natural History Survey and Museum.

² Gressitt, J. L. : Ling. Sci. Jour. 17 (1) : 45-56, pl. 4 (1938).

Tribe **Oemini****Oplatocera oberthuri** Gahan

Oplatocera oberthuri Gahan, Faun. Brit. India, Col. 1 : 108, fig. 43, 1906
 (Sikkim, Darjeeling, British Bhutan); Gressitt, Phil. Jour. Sci. 57 :
 182, 1935 (Formosa and Szechwan Province, China).

Two specimens were collected: one at Shin Kai Si, Szechwan, the other at Chengtu, Szechwan, 1924; both by D. C. Graham.

Tribe **Hesperophanini****Hesperophanes campestris** (Faldermann)

Callidium campestris Faldermann, Mem. Acad. St. Petersb. (2) 2 : 435,
 1835 (Amur).

One specimen was taken at Tatsienlu, alt. 8,300 ft., on the Szechwan-Tibet border, on Aug. 16, 1930, by D. C. Graham. New to Szechwan Province; previously known from Amur, Korea and N. China.

The specimen measures 14.4 mm. in length and 3.5 mm. in breadth. It is light reddish-brown, clothed with oblique grayish-brown hairs; the prothorax is rounded at sides, slightly broader apically than basally; the scutellum is short, rounded behind and densely clothed with hairs.

Tribe **Callidiopsini****Ceresium sinicum** White

Ceresium sinicum White, Cat. Col. Brit. Mus. 7 : 245, 1855 (N. China).

A specimen was taken by D. C. Graham between Yachow and Tatsienlu, Szechwan Prov. New to Szechwan Province.

Tribe **Callichromini****Embrik-strandia bimaculata** (White)

Callichroma bimaculatum White, Cat. Col. Brit. Mus. 7 : 165, 1853 (N. China).

A specimen was taken at Si Gi Pin, Szechwan, by D. C. Graham. New to Szechwan Province; previously known from eastern China.

Tribe **Pyrestini****Erythrus fortunei** White

Erythrus Fortunei White, Cat. Col. Brit. Mus. 7 : 142, 1853 (Shanghai).

A specimen was taken at Suifu, Szechwan, by D. C. Graham. New to Szechwan Province; previously known from eastern and southeastern China and Formosa.

Tribe **Thranini****Thranius simplex** Gahan

Thranius simplex Gahan, Ann. Mus. Genova 34 : 15, 1895 (Burma).

A single specimen was collected at Yao Gi, near Muping, Szechwan, by D. C. Graham. The genus is new to China; this species was previously known from Burma and Bhutan.

Tribe Clytini

Chlorophorus eleodes (Fairmaire)

Clytus eleodes Fairmaire, Ann. Soc. Ent. France (6) 9 : 65, 1889
(Atentse, Tibet).

Three specimens were collected: two at Kuanshien, alt. 2,000 to 3,000 ft., 1930, and one at U Long Kong, Szechwan, by D. C. Graham. New to Szechwan Province; previously known only from Tibet.

Chlorophorus miwai Gressitt ?

Chlorophorus miwai Gressitt, Phil. Jour. Sci. 61 : 100, 1936 (Formosa and Hunan Province, China).

One specimen was collected at Ta Ning Ho, Szechwan Prov., June 1904.

Subfamily Lamiinae

Tribe Monochammini

Lamiomimus gottschei Kolbe

Lamiomimus Gottschei Kolbe, Arch. Naturg. 52 : 224, pl. 11, fig. 39, 1886 (Korea).

A single male was collected at Kuanshien, alt. 3,000 ft., Szechwan Prov., May 24, 1935, by D. C. Graham. New to Szechwan Province. Previously known from Korea, N. China, Manchuria and E. Siberia.

The specimen measures 29 mm. in length and 11 mm. in width. The elytra are shorter and more narrowed, and have the basal granulations less prominent, than in specimens from Korea.

Psacothaea hilaris (Pascoe)

Monohammus hilaris Pascoe, Trans. Ent. Soc. London (2) 4 : 103, 1857 (N. China).

Four specimens are in the collection: two males from Suifu, Szechwan, May 1928, a female from Chengtu, Szechwan, May 1 to 6, 1936, and a male from Mt. Omei, alt. 4,000 to 6,000 ft., Szechwan, Aug. 1934; all taken by D. C. Graham. New to Szechwan Province.

The specimens vary in length from 12.7 to 23.5 mm., and in breadth from 4.5 to 8 mm. The cephalic and pronotal stripes and elytral spots vary from pale yellowish-white to dark sulphur yellow, the ventral spots corresponding in color.

Perihammus bifasciatus Aurivillius

Perihammus bifasciatus Aurivillius, Ark. Zool. 15 (25) :21, 1924 (Kiukiang, Kiangsi, and Mt. Omei, Szechwan).

Three specimens were collected: two on Mt. Omei, alt. 11,000 ft., Sept. 1, 1933, and Aug. 1934, and one at Shin Kai Si, Mt. Omei, alt. 4,400 ft., June 16, 1934, near Chengtu, Szechwan, by D. C. Graham.

The specimens measure 17 to 20 mm. in length and 5.6 to 6.5 mm. in breadth. The color is reddish-brown to dark brown, with two zigzag bands crossing the elytra.

***Monochammus tesserula* (White)**

Monohammus tesserula White, Proc. Zool. Soc. London 26 : 508, 1888
(Hongkong).

Four examples represent this species: three from Chengtu, alt. 1,700 ft., Szechwan, June 1 to July, 1, 1933, and one at Suifu, Szechwan, June 11, 1929, taken by D. C. Graham.

***Dihammus cervinus* (Hope)**

Lamia cervina Hope, Gray's Zool. Misc. p 27, 1831.

Four specimens were taken at Mt. Omei, Szechwan, July to Sept., 1921, Aug. 1923, and Aug. 1929, two of them at Shin Kai Si, alt. 4,000 to 6,000 ft. New to Szechwan Province.

Length 21 to 22 mm.; breadth 7 to 8 mm. Fawn colored, densely and evenly pubescent, with light golden brown reflections; antennal segments paler basally and more reddish-brown apically.

***Dihammus contemptus* (Gahan)**

Haplochammus contemptus Gahan, Ann. & Mag. Nat. Hist. (6) 2 : 62, 1888 (China).

Eight examples are in the collection: five from near Muping, alt. 3,000 to 8,300 ft., Szechwan, July 1 to 25, 1929; one taken between Yachow and Muping, alt. 5,000 to 10,000 ft., Szechwan, Sept. 17, 1930; one from Uin Gin Shien, alt. 3,800 ft., July 15, 1928, and one merely labelled Szechwan; all taken by D. C. Graham.

The specimens measure 11.3 to 15.5 mm. in length, and 4 to 5.7 mm. in breadth. The color is dull rusty-brown with the disks of the elytra variegated with grayish-white; the antennae are reddish-brown with the scape dark brown and the bases of the following segments pale gray.

***Dihammus flocculatus*³ *paucisetosus* n. subsp.**

Male.—Broad, subparallel; second and third antennal segments greatly broadened and flattened. Brownish-black; body densely clothed with variable pubescence of varying length and lying in different directions, in places less recumbent, forming many variable brownish-black spots on elytra edged with reddish-golden, giving effect of raised areas (basal portions of elytra with actual corresponding swellings); head brownish-black, thinly and irregularly pubescent; antennae with scape black, following segments dark brownish-black, clothed with thin pubescence which is dark on third and fourth segments, pale on basal halves and black at extreme apices of following segments; prothorax with pubescence lying in different directions, forming reddish-golden spots according to the angle of light; scutellum briefly clothed with similar pubescence; ventral surface black or nearly black, thinly clothed with dark

³ *Monochamus flocculatus* Gressitt, Phil. Jour. Sci. 57 : 188, 1935 (N. Formosa).

brown pubescence; legs black with purplish-brown pubescence, except on coxae, trochanters, apices of femora and tibiae, and grooves on middle tibiae.

Head strongly concave between antennal supports, grooved medially on occiput and frons, sparsely and irregularly punctured on frons, which latter is about as wide as high and slightly emarginate at sides. Antennae nearly twice as long as body; scape subcylindrical, three-fifths as long as third segment, not very broadly cicatricised apically; third segment greatly broadened, slightly flattened, practically as wide as scape; fourth two-thirds as long as third, similar to third, but not quite so wide; fifth and following segments relatively very slender; fifth to ninth subequal in length, about three-fourths as long as fourth. Prothorax barely longer than width at base, strongly and bluntly toothed at middle of each side; disk with a narrow sinuate groove a short distance from base and a similar one before apex, a posteriorly accentuated mid-longitudinal ridge, flanked anteriorly on each side with a moderate swelling behind transverse groove and a feeble swelling on each side between these and basal angles; intervening spaces indistinctly vermiculate-punctate. Scutellum small and rounded behind. Elytra twice as long as broad, coarsely and irregularly punctured; basal portion with irregular impunctate swellings. Ventral surface and legs practically impunctate. Length 22; breadth 8 mm.

Holotype, male (U. S. Nat. Mus.), Si Gi Pin, alt. 6,000 to 7,000 ft., Szechuan Province, West China, Aug. 10, 1934, D. C. Graham, collector.

Differs from the typical form, from Formosa, in being lighter, more reddish-golden, with frons less punctured, the prothoracic swellings less abruptly raised, more distinctly grooved anteriorly and less acutely toothed laterally, the elytra less irregular and with more distinctly outlined patches of pubescence, the body surface almost lacking the scattered white hairs of the latter, etc.

Dihammus szechuanus n. sp.

Female.—Large, elongate, narrowed posteriorly; antennae slender. Dark reddish-brown above, densely, but thinly and evenly clothed with slightly purplish-brown silky pubescence, which is lustrous, giving varying shades according to angle of vision; head blackish, thinly clothed with silky brown pubescence; antennae dark brown, somewhat reddish beyond base, clothed with dark brown pubescence except for basal third or so of fourth and following segments, which portions are grayish-buff; ventral surface brownish-black, thinly clothed with purplish-brown pubescence; legs dark brown with similar pubescence.

Head broad, flattish in front, widest at genal angles; frons higher than wide, slightly constricted below antennal supports, feebly grooved in center, impunctate; vertex deeply and angularly concave

between the prominent antennal supports; occiput shallowly grooved medially, impunctate. Antennae two-fifths longer than body; scape distinctly swollen beyond middle, rounded and broadly cicatricised apically, only slightly more than one-half as long as third segment, irregularly punctulose; third segment slender, slightly thickened apically; fourth and fifth subequal in length, three-fourths as long as third segment; sixth to ninth shorter, subequal in length. Prothorax shorter than breadth at base, cylindrical, strongly toothed at middle of each side; surface with a depressed and irregularly punctured area surrounded by feeble swellings on anterior portion of disk; base with two subparallel transverse grooves. Scutellum small and rounded. Elytra two and one-third times as long as broad, distinctly narrowed, and rounded apically; surface somewhat irregular, with fine, but deep, punctures and irregular subtransverse vermiculations on basal half, and feeble punctures on apical portion. Ventral surface and legs practically impunctate; first hind tarsal segment as long as following two united. Length 31.5 mm.; breadth 10.2 mm.

Holotype, female (U. S. Nat. Mus.), Shin Kai Si, alt. 4,400 ft., Mt. Omei, near Kiating, Szechwan Province, West China, 1921, D. C. Graham, collector.

Differs from the preceding in being longer, smoother and more evenly pubescent, with the frons narrower and smoother, the prothorax shorter, flatter above and more strongly toothed laterally, the elytra smoother, etc. Differs from *D. sericeomicans* (Fairm.) in having the scape more swollen, the pronotum less tuberculate, the elytra more coarsely punctured and rugulose, the pubescence much darker and uniform, etc.

Dihammus sp.

Four specimens were collected: two from Shin Kai Si, alt. 4,400 ft., Mt. Omei, 1921, and Aug. 20, 1934, one from Muping, alt. 3,000 to 4,000 ft., Szechwan, 1929, and one from Uen-Chuan, Szechwan, Aug. 13, 1924; all taken by D. C. Graham.

Tibetobia millegrana (Bates) n. comb.

Monohammus millegranus Bates, Entomol 24 (suppl.): 80, 1891 (Szechwan).

Tibetobia Szechengiana Frivaldszky, Term. Fussetek 15: 119, 1892 (Tibet), n. syn.

Monohammus Touzolinii Pie, Bull. Soc. Ent France 1920: 198 (Yunnan), n. syn.

Two specimens are in the collection: one from Den Shiang Uen, near Ning Yuen Fu, alt. 8,000 to 9,500 ft., Szechwan, Aug. 9 to 16, 1928, the other from near Yuen Shi, alt. 4,000 to 8,000 ft., Szechwan, July 21, 1928; both taken by D. C. Graham.

Length 18 mm.; breadth 6.5 mm. Bluish-black, clothed with grayish-green scales, the dorsal surface densely covered with distinct

glabrous granules, those on head and prothorax somewhat foveolate or subasperate; ventral surface sparsely punctured.

The United States National Museum collection also contains a specimen from Thouan Tcheou, Yunnan, from the C. F. Baker collection, which is 16.5 mm. long, and is bright, pale green. All three of these specimens are females.

Melanauster pirouletii Fairmaire

Melanauster Pirouletii Fairmaire, Ann. Soc. Ent. France (6) 9 : 66, 1889
(Koui-Tcheou)

Two specimens were collected on Mt. Omei, Szechwan, one at Shin Kai Si, alt. 4,400 ft., near Kiating, 1921, the other at 11,000 ft. alt., Aug. 19, 1934, D. C. Graham. New to Szechwan Province.

Antennae with extreme base and apex of each segment after second annulated with white; each elytron with five fairly large whitish pubescent spots arranged along middle in an irregular line, as well as a few small irregularly placed dots; prothorax with a pair of narrow sublongitudinal stripes from apex to base on either side of middle of disk.

Uraecha angusta (Pascoe)

Monohammus? angustus Pascoe, Trans. Ent. Soc. London (2) 4 : 49, 1856 (N. China).

One specimen was caught at Chengtu, alt. 1,700 ft., Szechwan Prov., on May 17, 1933, by D. C. Graham. New to Szechwan Province.

The elytra have two subarcuate, oblique dark brown bands on each side at about middle, the latter continuing parallel to suture as a pair of whitish-tan stripes to a short distance before apices, where they become dark silky brown again; posterior lateral margin with two dark brown spots.

Blepephaeus succinctor (Chevrolat)

Monohammus succinctor Chevrolat, Revue Zool. (2) 4 : 417, 1852
("Shanghai").

Three specimens were taken at Suifu, Szechwan, April to June, 1923, by D. C. Graham. New to Szechwan Province.

The specimens vary from 16 to 23.5 mm. in length and 5.6 to 9 mm. in breadth. All are marked with black on basal portion of pronotum, bases of elytra near scutellum and irregularly on sides of elytra behind middle.

Tribe **Mesosini**

Mesosa taliana Pic ?

Mesosa taliana Pic, Mat. Longic. 10 (2) : 13, 1917 (Tali, S. China).

A single specimen was collected in Szechwan Province in 1928 by D. C. Graham.

***Agelasta formosana* Schwarzer**

Agelasta formosana Schwarzer, Entom. Blätter 21 : 61, 1925 (Formosa).

One example was taken at Shin Kai Si, alt. 6,000 to 7,000 ft., Mt. Omei, Szechwan Prov., July 30, 1933, by D. C. Graham. New to China.

Tribe **Xylorhizini*****Thylactus chinensis* Kriesche ?**

Thylactus chinensis Kriesche, Deutsche Ent. Zeitschr. 1924 : 289 (Canton, S. China).

A single specimen, questionably referred to this species, was collected in Yachow District, Szechwan Prov., May 1928; D. C. Graham, collector. New to Szechwan Province.

Tribe **Dorcaschematini*****Olenocamptus bilobus* (Fabricius)**

Saperda biloba Fabricius, Syst. Eleuth. 2 : 234, 1801.

A single specimen was taken at Suifu, Szechwan, by D. C. Graham. New to Szechwan Province.

The posterior elytral spots are considerably larger than is usual for this species.

Tribe **Xenoleini*****Xenolea asiatica* (Pic) n. comb.**

Aeschopalea asiatica Pic, Echange [40] 41 : 16, 1925 (Tonkin).

Several specimens were collected at Chengtu, alt. 1,700 ft., and Shin Kai Si, Mt. Omei, alt. 4,500 ft., Szechwan Prov., by D. C. Graham. New to Szechwan Province.

The markings are somewhat darker and more reddish than in examples from Indo-China or southern China.

Tribe **Niphonini*****Niphona furcata* Bates**

Niphona furcata Bates, Ann. & Mag. Nat. Hist. (4) 12 : 314, 1873 (Japan).

A single example was collected at Suifu, Szechwan, June 5 to 13, 1925, by D. C. Graham. New to Szechwan Province.

Tribe **Saperdini*****Thermistis croceocincta* (Saunders)**

Lamia croceocincta Saunders, Trans. Ent. Soc. London 2 : 178, pl. 16, fig. 6, 1839 (India).

Four specimens were collected: three at Mt. Omei and vicinity, Szechwan, July to August, 1922, the other simply labelled Szechwan Prov.; all taken by D. C. Graham. Heretofore unrecorded from China.

Length 21 to 22 mm.; breadth 7.7 to 8 mm.; black, the elytra broadly banded, and the prothorax marked antero-laterally, with sulphur yellow.

Pseudosaperda goliath Pic

Pseudosaperda goliath Pic, Echange 18 : 121, 1903 (Yunnan).

Two female specimens were taken at Yachow, Szechwan Prov., May to June, 1928, by D. C. Graham. New to Szechwan Province.

The specimens measure 20 to 31 mm. in length and 9.7 to 10.8 mm. in breadth at shoulders. The color is pale blue-green above with six large, squarish spots and some smaller ones on elytra and four oval spots in a transverse row on prothorax; occiput and frons each with a black spot.

Tribe **Gleneini**

Paraglenea fortunei (Saunders)

Glenea Fortunei Saunders, Trans Ent. Soc. London (2) 2 : 112, pl. 4, fig. 1, 1853 (N. China).

A single example was collected at Suifu, Szechwan, June 21, 1923, by D. C. Graham. New to Szechwan Province.

Prothorax pale green with two round black discoid spots; elytra black on basal half and apex, pale green behind middle.

華產天牛蟲之新種誌 (鞘翅目: 天牛科) (六)

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(摘要)

本文續嶺南科學雜誌第十七卷第一期，四五至五六頁。中
述發見於四川省之天牛蟲三十三種。以 *Dihammus flocculatus*
pauwisetosus 及 *D. szechuanus* 為新種

FURTHER NOTES ON SCIAENID FISHES OF CHINA

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(Continued from *Lingnan Science Journal* Vol. 17, No. 1, p. 43.)

Pseudosciaena Bleeker

Pseudosciaena Bleeker, 1863, Nederl. Tijdschr. Dierk. Amsterdam 1:142.
Type: *Pseudosciaena amblyceps* Bleeker (= *Sciaena crocea* Richardson, 1846), designated by Jordan, 1919, The Genera of Fishes 3:321.

Othonus Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:244, 246
Type: *Sciaena manchurica* Jordan & Thompson, orthotypic.

Laramichthys Jordan & Starks, 1904, Proc. U. S. Nat. Mus. 28:204.
Type: *Laramichthys rathbunae* Jordan & Starks, monotypic, probably young of *Pseudosciaena manchurica*.

Oblong, compressed, head large, tail usually slender. Mouth terminal, wide and strongly oblique with jaws equal in front, the lower jaw projecting when the mouth is open. Lips thin, smooth, the fringed edges between the teeth, 4 or 6 conspicuous pores, though not large, on undersurface of mandibular symphysis. No barbels. Maxillary protractile. Upper jaw with a band of villiform teeth, the outer series enlarged, conical and rather widely set; inner teeth of lower jaw also enlarged, similar to the outer row of premaxillary, the outer teeth villiform, in one or two rows, some inserted between the enlarged teeth. No teeth on symphysis of premaxillary; tip of mandible forming a knob with a small patch of irregular, subequal teeth. All dentation weak, no canines. Vomer and palate edentate. Tongue prominent. Nostrils double on each side, the hinder oval one close to eye. Preopercular limb serrated, the serrae not extending beyond the membrane. Operculum terminating in a single, blunt and flat spine. Branchiostegals 7; gillrakers rather long, 8-11+18-20, extreme one small and short, longest equal to gill-filaments, and about half as long as eye diameter. *Pseudobranchiae*. Interorbital, convex. Occipital bony ridge always present in young specimens up to a length of 90 millimeters, becoming obsolete in larger fish. Spinous dorsal with a deep notch; soft dorsal and anal densely covered by small cycloid scales. Second anal spine weak commencing below about middle of soft dorsal and ending far in advance of soft dorsal axilla. Caudal wedge-shaped, median point behind. Lateral line boldly arched anteriorly and extending to tip of caudal. Head partly covered by cycloid scales; strong ctenoid scales on body. Golden dermal glandular organs present below lateral line, one below each scale. The presence of dermal organs in *Pseudosciaena* makes their young similar to *Collichthys*. Vertebrae 26-29. Mouth and abdominal cavities white or gray.

The most abundant and important food fishes in Korean and Chinese coastal waters. Fowler (1933) is right in confining this genus to the species with conspicuous small pores on chin, with soft dorsal and anal densely covered by small cycloid scales which extend almost to margin, and with large dermal glandular organs on the abdominal portion of the body, one below each scale. Fishes of the genus *Pseudosciaena* are closely allied to *Collichthys* and are not to be found elsewhere besides the Chinese, Korean and Japanese seas. Only two species are admitted here. Weber & de Beaufort extend *Pseudosciaena* to include such fishes as *Corvina goldmanni* Bleeker, *Johnius aeneus* Bloch, *Corvina sina* Cuv. & Val., but such an arrangement does not show proper generic relationship.

Synopsis of Chinese Species of *Pseudosciaena*

1. Vertebrae 26 (25); depth of caudal peduncle in its length 3.3-4.4. Scales small, 8-9 series between origin of spinous dorsal and lateral line *crocea*
2. Vertebrae 29 (28); depth of caudal peduncle in its length 2-3. Scales large, 5-6 rows between origin of spinous dorsal and lateral line *manchurica*

Pseudosciaena crocea (Richardson)

Sciaena crocea Richardson, 1846, Ichth. China, Japan p. 224 (type locality: South China, Canton); Elera, 1895, Cat. Fauna Filip. I 501 (Cavite; Luzon).

Pseudosciaena amblyceps Bleeker, 1863, Nederl. Tijdschr. Dierk. Amsterdam 1:142 (type locality: Amoy); 1865, ibid. 2:56 (Amoy); Fowler (part), 1933, U. S. Nat. Mus. Bull. 100, 12:369 (China; Japan); Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):7 (Shantung; Kwangtung; Chekiang); Tang, 1937, Amoy Mar. Biol. Bull. 2(2):52 (part) (Chefoo; Chusan; Amoy; Hainan).

Corvina amblyceps Bleeker, 1870, Versl. Med. Akad. Amsterdam ser. 2, 4:250 (China); Sauvage, 1881, Bull. Soc. Philom. Paris ser. 7, 5:106 (Swatow, China).

Sciaena amblyceps Steindachner, 1892, Denk. Akad. Wiss. Wien, math.-natur. Kl. 59 (1):363 (Shanghai); Rutter, 1896, Proc. Acad. Nat. Sci. Phila. p. 76 (compiled).

Pseudosciaena polyactis Bleeker, 1877, Versl. Med. Akad. Amsterdam, Proc. Verb., No. 27; 1879, Verh. Akad. Amsterdam 18:5, pl. 1, fig. 1 (type locality: Shanghai, China); Jordan & Seale, 1905, Proc. U. S. Nat. Mus. 29:522 (probably Shanghai).

Pseudosciaena undorivata Jordan & Seale, 1905, Proc. Davenport Acad. Sci. 10:11, pl. 6 (type locality: Hong Kong).

Corvula argentata Jordan & Starks (not Houttuyn), 1906, Proc. U. S. Nat. Mus. 31:518 (Port Arthur, Manchuria).

Sciaena ogiwara Nichols, 1913, Bull. Amer. Mus. Nat. Hist. 32 (7):180, fig. 2 (type locality: Shimonoseki, Japan).

Nibea crocea Chu, 1931, Index Pisc. Sinen. p. 134 (compiled).

Pseudosciaena crocea Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):58 (China sea; Fusan).

D. VIII-IX/1/31-34; A. II/8-9; V. 1/5. L. l. with about 59 tubular scales; l. tr. 8-9/14-17; predorsal scales 27-40. Depth in length 3.4-3.7; head 3.5-3.7. Eye in head 5-5.3; snout 4; interorbital 3.3; length of peduncle 1.1; its depth 4.2. Depth of peduncle in its length 3.5 to 4.4.

Oblong, compressed, head large and tail slender. Mouth terminal, wide and oblique with jaws equal in front, but lower jaw projecting when the mouth is open. No supplementary maxillary bone. Lips thin, smooth with finely fringed margin. 4 pores on undersurface of mandibular symphysis. No barbels. Maxillary protractile. Upper jaw with band of villiform teeth, the outer series of which becomes enlarged and conical. Inner row of teeth on lower jaw also enlarged, some smaller ones between them and one or two series of small teeth in the outer row. Maxillary symphysis devoid of teeth; a small patch of irregular teeth at mandibular symphysis. Vomer and palate edentate. Tongue prominent. Nostribs double on each side and close to eyes which are lateral and of moderate size. Whole head is covered by scales except lips, jaws, and ventral surface. Preopercular margin finely serrated; the marginal membrane usually extending beyond the serrature. Operculum terminating in a single, blunt and flat spine. Brachistegals 7; gillrakers rather long, 8-11+18-20, extreme one small and short, longest equal to gill-filaments and about half as long as eye diameter. Pseudobranchiae present. Interorbital convex. No bony ridge on occiput except in young less than 80 mm. in length. The young fish of this species have a bony crest of considerable length, which is broken up into 4 or 5 sharp tubercles or spines. Dorsal origin above base of pectorals; a deep notch between spinous and soft portions. First dorsal spine minute, third one longest, about 2.5 in head length. Pectorals reaching to 19th scale of lateral line. Ventral thoracie. Anal origin behind middle of base of soft dorsal, opposite to 16th soft ray. First anal spine minute; second spine weak, as long as eye diameter. Caudal spear-shaped with pointed tip. Lateral line extending to tip of caudal. Scales strongly ctenoid on nape, trunk, thorax, abdomen and tail but the snout, opercles, orbita and interorbital space, soft dorsal and anal are covered by cycloid scales. The scale below spinous dorsal with 21-23 basal radii, about as long as wide. Basal angle broadly rounded. Scales below lateral line are larger than those above lateral line; silvery or golden dermal organs on side of body most conspicuous below lateral line, one below each scale; these dermal organs become indistinct in old specimens. Soft dorsal and anal densely scaled nearly to margin. Intestine short. Pyloric caeca 14. Air bladder simple, extending the whole length of the abdominal cavity, with 27 pairs of very small appendages. Vertebrae 10+15=25 or 11+15=26. Peritoneum gray with condensed small specks in the lower part of abdominal cavity.

Color brownish-yellow with gray spot at center of each scale, forming oblique bands more or less distinct above lateral line. Dorsal and caudal brown, dusted with little darker specks terminally. Lower fin whitish.

Very common fish along Chinese coast from Shantung to Kwangtung. Fishing season at Kwangtung extends from October to December; at Chekiang from May to July. All specimens obtained from aforesaid localities were provided with mature reproductive organs. Most common size 450-600 mm. from tip of snout to end of caudal. Smallest specimen found in the fishing ground of Chusan during fishing season measures 320 mm. Though in Chusan *P. crocea* are caught in large quantity in April, May and June, the best fishing season is within the first ten days of May; before April and after June *crocea* are rather rare in Chusan. One specimen 400 mm. was sent from Fusan, Chosen, by Dr. K. Uchida.

This species can best be distinguished from *P. manchurica* by the decreased number of vertebrae and scales. Superficially it is practically identical with *manchurica* but when the vertebrae and the scales are counted the difference can immediately be recognized.

Pseudosciaena manchurica (Jordan & Thompson)

Sciaena manchurica Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:255, fig. 3 (type locality: Port Arthur, Manchuria); Jordan & Metz, 1913, Mem. Carnegie Mus. 6(1):38, fig. 28 (copied); Sowerby, 1930, The Naturalist in Manchuria 4:189 (compiled).

Othonias undovittatus Jordan & Hubbs (not *Pseudosciaena undovittata* Jordan & Seale), 1925, Mem. Carnegie Mus. 10(2):244 (type and paratype of *Sciaena manchurica*; Osaka, Japan); Chu, 1931, Index Pisc. Sinen. p. 135 (copied).

Nibea manchurica Mori & Uchida, 1934, Jour. Chosen Nat. Hist. Soc. 19: 14 (Fusan and Chinnampo, Chosen).

Pseudosciaena undovittata Lin (not Jordan & Seale), 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):9, fig. 4-5 (Chekiang).

Pseudosciaena manchurica Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2): 59 (Fusan; China Sea).

D. IX-X/1/32-33; A. II/8-9; V. 1/5. L.l. with 56 tubular scales; l.tr. 5-6/12; predorsal scales 26. Depth in length: 3.3-3.6; head 3.1-3.5. Eye in head 5.4-6; snout 3.8; interorbital 3.8; longest dorsal spine 2.6; second anal spine 7.8-10; peduncle length 1.2-1.3; its depth 3-3.6. Depth of peduncle in its length 2-3.

The rather deep body is oblong and compressed. Head large, mouth wide, oblique with jaws about equal in front, the lower jaw projecting when mouth is open. Lips of moderate thickness, with margin finely fringed. Maxillary extending to vertical from posterior border of orbit. Villiform teeth on jaws; outer upper series and inner lower series enlarged. All dentation is rather weak, no canines. Vomer and palate edentate. 6 pores on undersurface of mandibular symphysis. One distinct pore usually present at tip of female specimen. No barbels, snout short; interorbital convex.

Eyes circular with free rim. Preopercular edge weakly crenulate, the lower limb spinate, the angle rounded. Operculum terminating in a single point. Pseudobranchiae present. Branchiostegals 7. Gillrakers of moderate length, 10+19 on the anterior arch, extreme ones small or rudimentary; longest slightly longer than gill-filaments and 1.4 in eye diameter. Suprascapular flap large and strongly fringed. Dorsal origin opposite to base of pectorals; a deep notch between spinous and soft portions; first dorsal spine minute, third spine longest; in most, soft ray about as long as longest dorsal spine. Somewhat more than half of the lower portion of soft dorsal and of anal covered by small scales, though not so dense as in *Pseudosciaena crocea*. Base of caudal is also covered by scales. Pectorals long, 1.25 in head. Ventrals slightly shorter than pectorals. Caudal cuneate. Anal origin slightly behind middle of soft dorsal, opposite 17th soft ray. Lateral line straight. Scales on head before nape and on opercles and on soft dorsal and anal cycloid; those on trunk and tail ctenoid. Scale below spinous dorsal with 16-18 basal radii; with 29-44 apical denticles. Circuli fine; annuli distinct; silvery or golden dermal glandular organs on side of body most conspicuous below lateral line, one below each scale; these dermal organs become indistinct in old preserved specimens. Intestine short; pyloric caeca 14; air-bladder one, lying in the whole length of abdominal cavity. 24 pairs of appendages. Vertebrae 12+17=29. Peritoneum gray.

Bright brownish-yellow, darker above and pale below. Margin of spinous and soft dorsal blackish. Paired fin and caudal all tinted with yellowish wash. A narrow white band on lateral line. Iris reddish or bright brown.

Many specimens, 115-283 mm. to base of caudal, collected from Tsingtao, Shantung coast, contained mature eggs filling the abdominal cavity. This fish is very common in the seas of Manchuria, Chosen, Shantung, Kiangsu and Chekiang; the fishing season extends from the end of March to May. Practically every fish examined during April and May was provided with ripe eggs and sperm. They come along shore to spawn. Average size of this species found at Chusan measures about 240 mm. to base of caudal. One specimen 270 mm. was sent from Fusan, Chosen, by Dr. K. Uchida.

Miichthys gen. nov.

Body rather elongate, compressed. Head small, tapering. Snout, cheek, interorbital and opercles covered by small scales. Lips of moderate thickness, fringed along edge. Snout not overhanging the mouth which is wide and slightly oblique. Jaws equal in front or the lower slightly shorter; rostral margin widely lobate with a large pore in center and some indistinct ones above. Pores on mandibular symphysis paired, 4 in number, 2 being just on the

mental knob and other 2 situated immediately behind. No barbels. Inner teeth of lower jaw enlarged, strong, sharp, and somewhat canine-like, about 6-7 on each side; the outer series much crowded together and smaller, some in the interspace of inner enlarged teeth. Teeth of upper jaw villiform, in a narrow band comprising 2 to 4 series of villiform teeth; the outer series enlarged, the front pair somewhat canine-like. Vomer and palate edentate. Branchiostegals 7; pseudobranchiae. Gillrakers short, 6+9 on anterior arch, extreme ones rudimentary. Preopercular limbs crenulate; operculum terminating in one single point. Spinous dorsal with a deep notch; the spines of moderate length, slender; D. IX/1/28-29. Second anal spine weak and slender. A. II/7. Lower half of soft dorsal and anal are covered by small cycloid scales; their basal sheaths are composed of small ctenoid scales. Scales on head partly ctenoid, on body entirely ctenoid. Mouth and abdominal cavities gray. Vertebrae 24-25.

Very common food fishes in Chekiang, Kiangsu, Shantung and South Korean coastal waters.

Miichthys is distinguished from *Pseudosciaena* by absence of dermal glaudular organs, from *Wak* and *Johnius* by the paired pores on chin, and from *Argyrosomus* by the presence of small scales on soft dorsal and anal. *Miichthys* is similar to *Otolithes* and *Otolithoides* in general form, but it differs from them in having no true canines on jaws and in having pores on chin. The presence of small cycloid scales on soft dorsal and anal is also unique.

Mi is a Chinese name of this fish: *ichthys* a Greek word for fish.

Type: *Sciaena mi-iuy* Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10:22 (Mari meridiano, Peking).

***Miichthys miuy* (Basilewsky)**

Sciaena mi-iuy Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10:22 (Mari Meridiano; Peking).

Pseudosciaena amoyensis Bleeker, 1863, Nederl Tijdschr Dierk Amsterdam 1:144 (type locality Amoy).

Sciaena amoyensis Steindachner, 1892, Denk Akad. Wiss. Wien, math-nat. Kl. 59(1): 362 (Shanghai).

Pseudosciaena japonica Tang, 1937, Amoy Mar Biol Bull. 2(2): 67 (Shanghai; Amoy).

Sciaena japonica Jordan & Metz (not Schlegel), 1913, Mem. Carnegie Mus. 6(1):35, pl. 7, fig. 1 (Chinnampo, Fusan, Seoul); Sowerby, 1930, The Naturalist in Manchuria 4:187 (Tientsin, Peitai Ho; Chin Wang Tao; Dalin).

Nibea japonica Jordan & Hubbs, 1925, Mem. Carnegie Mus. 10(2):244 (Tokyo; Shizuoka).

Sciaena (Nibea) japonica Schmidt, 1931, Trans. Pac. Comm. Acad. Sci. USSR 2:72 (Fusan).

Otolithus ? miuy Chu, 1931, Index Pisc. Sinen p. 136 (compiled).

Corvina japonica Lin, 1935, Bull. Chekiang Prov. Fish Expt. Sta. 1(1): 11, fig. 6 (Chusan; Shantung).

Nibea miuy Wang, 1935, Contr. Biol. Lab. Sci. Soc. China 10(9) :446, fig. 31 (Chefoo, Shantung).

Nibea imbricata Matsubara, 1937, Jour. Imp. Fish. Inst. 32 (2) :36, fig. 8 (China Sea).

D. IX/1/29; A. II/7; V. 1/5. L.I. with 52 tubular scales (60 as recorded by Schmidt); l.tr. 9/16. Predorsal scales 40-50 to tip of snout. Depth in length 4.1-4.4; head 3.5-3.6. Eye in head 5.2-2.4; snout 4.3; interorbital 4.8; longest dorsal spine 2.7; second anal spine 4.1; peduncle length 1.1; its depth 3.5. Depth of peduncle in its length 3.1.

Oblong, compressed. Head tapering. Snout, cheek, interorbital and opercles are covered by small scales. Lips of moderate thickness, fringed along edge. Snout short, not overhanging the mouth which is wide and slightly oblique. Jaws equal or the lower slightly included. The inner row of teeth on lower jaw strong, sharp and rather longer than the rest, about 6-7 on each side of mandible; outer series much smaller and crowded together. Teeth of upper jaw villiform, the outer series enlarged; the front pairs somewhat canine-like; a narrow inner band comprising 2 to 4 series of villiform teeth. Vomer and palate without teeth. 4 pores on underside of mandibular symphysis. No barbels. Snout with a median distinct pore. Maxillary extending to or slightly beyond posterior margin of orbit. Interorbital convex. Eyes of moderate size, longer than wide. Branchiostegals 7. Gillrakers short, 6+9 on the anterior arch, extreme ones rudimentary, longest 2.5 in eye diameter. Pseudobranchiae present. Preopercular edge ctenate (or crenulate). Operculum terminating in a single point. Dorsal commences above base of pectorals, with a deep notch between spinous and soft portions. Spinous and upper half of soft dorsal devoid of scales. Lower half of soft dorsal and base of anal covered by scales. Anal origin behind middle of soft dorsal base, or opposite 14th soft dorsal ray. First anal spine minute, second spine weak and slender. Pectorals pointed, 1.4 in head. Ventrals, thoracic, slightly shorter than pectorals. Caudal cuneate. Lateral line straight with the sensory tubes branched posteriorly. Scales strongly ctenoid, those below spinous dorsal with 11 to 14 basal radii; 32-49 apical denticles. Intestine short, in one coil; pyloric caeca large, 5 in number; stomach short, but very large. Peritoneum gray, with some small black specks. Air-bladder thick-walled, lying the whole length of abdominal cavity. Vertebrae 24.

Uniformly slate-dark throughout, much darker above and pale below. Margin and upper half of spinous dorsal black. Soft dorsal black terminally. One row of dark spots along the middle of soft dorsal. Eye dull; pectorals, ventrals, anal and caudal dark. A darker mark at base of each scale, forming oblique bands above line; these bands becoming paler proceeding downwards; a dark blotch at pectoral axilla.

Very common food fish in Chusan and Shanghai; common size, 200 to 900 mm. to base of caudal. Three specimens 298 to 485 mm. from Shantung and one specimen 370 mm. from Fusen, Chosen.

Bahaba Herre

Bahaba Herre, 1935, Ling. Sci. Jour. 14(4):603. [Type, *Otolithes (Bahaba) lini* Herre = *Bahaba flavolabiata* (Lin).]

Oblong, compressed, head large, peduncle long and slender; mouth large, oblique, with lower jaw slightly longer; outer series of premaxillary teeth enlarged, villiform teeth in narrow band behind it; two series of small, conical teeth on lower jaw, the inner series slightly enlarged, no true canine; below the symphysis only 2 inconspicuous pores, no median pore; barbels absent. Eyes small, high, in anterior half of head; interorbital convex; preopercular limbs finely serrated, angle rounded; operculum with two weak points, the lower median point longer; gillrakers short, 11 and 4 rudiments on lower branch and 4 (2 rudiments) on upper branch of anterior arch. Dorsal deeply notched, with VII to VIII strong spines, and 21 to 23 rays; anal short with second spine very strong, more than two-thirds the first ray, containing 3 to 4.5 in head; caudal cuneate. Scales on anterior half of head cycloid, elsewhere on head and body ctenoid. Soft dorsal and anal devoid of scales. Vertebrae 24.

One species known in the coastal waters of China. Ranging from Kiangsu to Kwangtung; valued as food fish, the air-bladder of large individuals regarded as a most nutritious piece of food.

Bahaba flavolabiata (Lin)

Nibea flavolabiata Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1 (1):14, fig. 7 (June, 1935) (type locality: Chusan).

Otolithes (Bahaba) lini Herre, 1935, Ling. Sci. Jour. 14 (4):603 (October 1935) (type locality: Hong Kong).

Pseudosciaena flavolabiata Tang, 1937, Amoy Mar. Biol. Bull. 2(2):72, fig. 6 (Hong Kong).

D. VII/1/23-24; A. II/7; V.1/5. L.l. with 55 to 60 tubular scales; l.tr. 8/15; predorsal scales about 35. Depth in length 5.3; head 3.6. Eye in head 8.7; snout 4.8; interorbital 6.8; peduncle length 1.2; its depth 4.3; longest dorsal spine 2.8; second anal spine 3.1. Depth of peduncle in its length 3.6.

Oblong, compressed. Head large peduncle long and slender. The whole body is covered by scales except lips and jaws. Mouth large, oblique, with the lower jaw slightly the longer. Lips of moderate thickness; their margin finely fringed. The outer series of teeth on upper jaw enlarged, villiform teeth in narrow band behind it. Two series of small, conical teeth on lower jaw, the inner row slightly enlarged. No true canine on either jaw. Vomer and palate edentate. The small pores at chin, widely set. Sometimes the pores are invisible in large specimens. No barbel at underside.

of mandibular symphysis. Eyes small, high. Interorbital, convex. Preopercular margin finely serrated or membranous. Operculum terminating in two weak points, the lower medial one longer. Branchiostegals 7. Gillrakers 11 and 4 rudiments on lower branch, and 4 (2 rudiments) on upper branch. Dorsal origin behind base of pectorals. A deep notch between spinous and soft portions. First dorsal spine minute, 3rd or 4th spine longest. Anal short, commences under middle of soft dorsal base, or opposite 10th dorsal ray. Second anal spine strong, about two-thirds or more anal ray. Pectorals about 2 in head. Ventrals thoracic, shorter than pectorals. Small cycloid scales on snout, cheek, anterior half of interorbital space, and preoperculum. The serrae of opercular scales rudimentary. Strongly ctenoid scales on nape, posterior half of interorbital space, body and tail. Scales below dorsal wider than long; basal radii increase in number with age, about 60 in a specimen measuring 1500 mm. long to base of caudal and, by scale reading, appearing to be nine years old. Vertebrae 24 (10+14).

Color uniform; mouth colorless, somewhat yellowish-gray in a large mounted specimen.

One mounted specimen 1500 mm. to base of caudal, from Chusan in the Zool. Lab., Chekiang Prov. Fish. Expt. Sta., Tinghai. 3 specimens 230, 270 & 340 mm. from Canton. The young of this species, about 300 mm. long, is evidently abundant in the coastal water of Kwangtung during the months of November, December, and January.

Argyrosomus de la Pylaie

Argyrosomus de la Pylaie, 1834 (1835), Compt. Rend. Congr. Sci. France, Poitiers (Recherches en France, Poiss.) p. 534. (Type *Argyrosomus procerus* de la Pylaie = *Labrus hololepidotus* Lacèpède, monotypic; type locality: great equatorial Ocean).

Oblong, compressed, head bluntly pointed; snout broadly rounded with 3 big pores on the margin of rostrum; mandible with 6 small but distinct pores on under-surface around chin. Jaws equal in front, gape of mouth rather wide. Premaxillary with a band of short, small, villiform teeth, the outer series enlarged becoming conical and slightly curved backward. Mandible with 2 series of teeth, the inner series enlarged, conical and widely set, the outer small and closely set, usually inserted in the space between the enlarged teeth of the inner series; mandibular symphysis with a broad knob but not very prominent. Inner band of villiform teeth of upper jaw not continuous across the symphysis. Vomer and palate edentate. Tongue free, its tip round. Preopercular limb slightly slanting forward or backward, crenulate, with or without distinct spines; angle broadly rounded, with a shallow marginal emargination just above the curvature. Operculum terminates in 2 blunt, flat points, the upper point longer. Posttemporal small,

faintly fimbriate. Branchiostegals 7. Gillrakers stout and short; pseudobranchiae. Dorsal with a deep notch, $X/1/24$ to 33; anal short II/7, the second spine of moderate strength, about 4 in head; caudal truncate or cuneate. Scale cycloid on snout and cheek, on the rest of body ciliate. Vertebrae 24 to 26.

Usually fishes of large size, found in Eastern tropical Atlantic, Mediterranean, Red Sea, Madagascar, Natal, South Africa, Western Australia, South Australia, Victoria, Tasmania, New South Wales, Queensland, China, and Japan.

Remarks: Fowler (1933, U. S. Nat. Mus. Bull. 100, 12:370) adopted *Johnius* of Bloch to include all the species with pores on chin except *Pseudosciaena amblyceps*. To use *Johnius* with *Johnius caruta* Bloch as genotype in such extensive and ill-confined manner does not make a good and logical generic arrangement. In fact, *Johnius caruta* is more closely related to *Sciaena cirrosa* Linnaeus than *Labrus hololepidotus* Lacèpède, *Corvina sina* Cuvier & Valenciennes and other allied species. Bleeker correctly states that the presence and absence of a mental barbel is not without transition. Weber & de Beaufort are right in dividing the Sciaenid fishes into the two ecologically different groups of *Otolithinae* and *Sciaeninae*, and placing *Johnius* s. str. and *Sciaena* s. str. under *Sciaeninae*. As already shown in the analytical key, *Pseudosciaena crocea* differs from *Labrus hololepidotus* Lacèpède, or *Sciaena aquila* Risso, and *Corvina sina* Cuv. & Val. in having the soft dorsal and anal densely covered by small, cycloid scales, and in having glandular dermal organs on the lower part of the body, and if *Pseudosciaena amblyceps* is to be accepted as the type of the genus *Pseudosciaena*, some other generic name should be adopted to receive *hololepidotus*, *sina* and other related species. *Argyrosomus* de la Pylaie is, then, virtually the available name.

Synopsis of species of *Argyrosomus*

1. Caudal truncate or biconcave at least in adult specimens 2
Caudal cuneate in young and adult. 3
2. Eyes small, 7-8 in head. D. X-XI/27-29. Fish of considerable size. *japonicus*
Eyes large, 4-4.7 in head. D. X/1/24. Fish of small size. *aneus*
3. Mouth and abdominal cavities very black. Eye 4 or more in head. D. X/1/30-32; A. II/7-8 *nibe*
Mouth and abdominal cavities white, yellowish, or dusted with small dark specks, never black. D. X/1/24-30. A. II/7 4
4. Dorsal rays 24-27; body rather thin *argentatus*
Dorsal rays 27-30; body thick *ihiarae*

Argyrosomus japonicus (Schlegel)

Sciaena japonica Schlegel, 1843, Fauna Japonica, Pisces 2-4 : 58, pl. 24, fig. 1 (type locality: southwest coast of Japan).

Nibea japonica Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2) : 41, fig. 9-10 (Tokyo).

D. X/1/27-29, A. II/7½ L.l. 50; l.tr. 9-10/10 to anal origin. Depth in length 4.4; head 3.5. Eye in head 8.7; snout 3.4; postorbital space 1.6; interorbital 4.3; pectoral 1.7; dorsal spine 2.5; ventral 2; second anal spine 5.4; anal ray 2.5; peduncle length 1.1; its depth 4. Peduncle depth in its length 3.4. Second anal spine about half as long as the first ray.

Oblong, compressed; head pointed; both dorsal and ventral profile about equally arched. The snout is broadly rounded, with 3 big pores on the somewhat wavy margin of rostrum. Mandible with 6 pores on chin, one of the frontmost 2 pores sometimes obsolete, the two slightly larger ones behind on each side being very distinct. Mouth moderately oblique, its cleft extending to the vertical below hind border of pupil; upper margin of maxillary concealed under preorbital sheath, dilated behind with median point extending slightly beyond the line connecting the upper and lower angles. Premaxillary with a band of villiform teeth, the outer series enlarged, widely set, conical and slightly curved inward. These enlarged outer teeth gradually become larger in front. Mandibular teeth arranged in 2 series, the inner series enlarged, widely set and conical as above, the outer row small and closely inserted in between the inner enlarged teeth. A broad but not prominent symphysial knob on mandible. Band of villiform teeth on upper jaw continuous across the symphysis. Vomer and palate edentate. Tongue free, its tip round. Nostrils double on each side, posterior one circular and closer to eye which is small, situated above the horizontal line from commencement of mouth cleft. Preopercular limb slightly slanting forward, crenulate, devoid of conspicuous spines, its angle broadly round with a shallow marginal emargination above it. Operculum terminating in 2 blunt flat points, the upper one longer. Posttemporal, small, faintly fimbriate. Branchiostegal 7. Gillrakers short, stout, 4+9-10, two of upper and one or two of lower branch rudimentary, longest 2.3 in eye and about half as long as filaments. Pseudobranchiae. Spinous dorsal with a deep notch, the first spine minute, third spine longest; soft dorsal low. Anal short, its base about 5 times in the base of soft dorsal. Second anal spine of moderate strength, half as long as first anal ray, 1.6 times the eye diameter. Anal origin opposite the 12th or 13th soft dorsal ray. Caudal truncate, the rays at middle and at lower angle slightly longer. Lateral line running in parallel with dorsal profile, with 50 or 51 tubular scales. The sensory tubes ramify into numerous branches posteriorly. Scales on snout, preorbital and cheek are cycloid, those on edge of preopercle, interorbital, nape, and the whole body are ciliate. Soft dorsal and anal devoid of scales; dorsal basal sheath is low, and formed as extension of the scales from back, none sticking close to the membrane of the fin. Vertebrae 26.

Dark gray above with silvery greenish reflection. Below on abdomen the color is pale, but not silvery-white as in *Pseudosciaena*

crocea. Lips are dark; mouth cavity white. Pectorals, ventrals and anal light, caudal dusky. Spinous dorsal black terminally, dusky. Axilla of pectoral with a large black blotch.

One specimen 942 mm. to base of caudal with 29 soft dorsal rays was skinned and mounted after examination, two more specimens 1020-1032 mm. with 27 soft dorsal rays were examined and identified in the fish market.

Argyrosomus aneus (Bloch)

Johnius aneus Bloch, 1793, Naturg. Ausland Fische 7 : 135, pl. 257 (type locality : Malabar); Bloch & Schneider, 1801, Syst. Ichth. p. 74 (Tiarquebar).

Johnius aeneus Fowler, 1926, Jour. Bombay Nat. Hist. Soc. 30(4) : 777 (Bombay); 1927, Proc. Acad. Sci. Phila. p. 285 (Philippines) (Error).

Labrus aneus Lacépède, 1802, Hist. Nat. Poiss. 3 : 447, 517 (on Bloch).

Corvina anei Cuvier, 1830, Hist. Nat. Poiss. 5 : 131 (on Bloch).

Otolithus aneus Day, 1867, Proc. Zool. Soc., London p. 939 (Madras); 1870, ibid p. 684 (Andamans).

Otolithes aneus Fowler, 1931, Proc. Acad. Nat. Sci. Phila. p. 446 (Singapore).

Sciaena aneus Day, 1876, The Fishes of India 2 : 189, pl. 45, fig. 5 (Batavia; Bombay; Andamans; Madras); 1889, Faun. Brit. India, Fishes 2 : 119; Lloyd, 1907, Rec. Indian Mus. 1 : 226 (Akyab); Seale, 1914, Phil. Jour. Sci. 9(1) : 69 (Hong Kong); Pearson, 1915-1918, Ceylon Administr. Rept. p. F10-F14

Pseudosciaena aneus Bleeker, 1877, Atlas Ichth. 9, pl. (2)385, fig. 2; Weber & de Beaufort, 1936, Fish. Indo-Austr. Archipel. 7 : 508 (Singapore; Banka; Bintang; Sumatra; Java; Borneo; Celebes); Tang, 1937, Amoy Mar. Biol. Bull. 2(2) : 59, fig. 4 (Hainan, Kwangtung).

Pseudosciaena anea Jordan & Seale, 1906 (1907), Bull. Bur. Fish., Washington 26 : 25 (Cavite); Jordan & Richardson, 1907 (1908), Bull. Bur. Fish., Washington 27 : 261 (Manila); Seale, 1910, Phil. Jour. Sci. 5(4) : 280 (Sandakan; Borneo).

Argyrosomus aneus Fowler, 1918, Copeia, No. 58, p. 64 (Philippines).

Otolithus macrophtalmus Bleeker, 1850, Nat. Tijdschr. Nederl. Ind. 1 : 99 (type locality . Batavia; Bantam; Samarang; Pasuruan)

Sciaena macrophtalmus Gunther, 1860, Cat. Fish. Brit. Mus. 2 : 291 (compiled); Karoli, 1881, Term. fuzetek, Budapest 5 : 159 (Palaboen)

Corvina macrophtalmus Bleeker, 1868, Versl. Med. Akad. Amsterdam ser. 2, 2 : 292 (Bintang).

Pseudosciaena macrophtalmus Bleeker, 1874, Verh. Akad. Amsterdam 14(4) : 21 (Singapore; Bintang; Banka, Java; Celebes).

?*Johnius resplendens* Hombron & Jacquinot, 1853, Voy. Pole Sud, Zool. 3 : 45, pl. 5, fig. 1 (no locality).

Otolithus leuciscus Gunther, 1872, Ann. & Mag. Nat. Hist. ser. 4, 10 : 398 (type locality . Manila Bay, Philippines); Meyer, 1885, Anal. Soc. Espan. Hist. Nat. Madrid 14 : 23 (Manila Bay); Elerna, 1895, Cat. Fauna Filip. 1 : 503 (Luzon).

Corvina belangerii Evermann & Seale (not Valenciennes), 1906, Bull. Bur. Fish., Washington 26 : 87 (San Fabian).

Argyrosomus goldmani Fowler (not Bleeker), 1918, Proc. Acad. Nat. Sci. Phila. p. 43 (Philippines); 1918, Copeia No. 58, p. 64 (same material).

Johnius aeneus Herre, 1931, Notes Fishes Zool. Mus. Stanford Univ. p. 57 (Philippines); Fowler, 1935, U. S. Nat. Mus. Bull. 100, 12 : 376 (Luzon; Samar; Cavite; Borneo; Sandakan; Java; Singapore).

Bola aeneus Chu, 1931, Index Pisc. Sinen. p. 136 (compiled).

D. X/1/24; A. II/7. L. l. with 49 tubular scales; l.tr. 7/14. Depth in length 3.7; head 2.9. Eye in head 4.7; snout 3.8: postorbital space 2; interorbital 3.8; pectoral 1.3; longest dorsal spine 2.2; ventral 1.9; second anal spine 4.3; peduncle length 1.4; its depth 3.8.

Oblong, compressed. Head large; snout bluntly pointed with a median pore, its margin entire. Mouth wide, strongly oblique, the lower jaw projecting when the mouth is open; tip of mandible touching the dorsal profile; maxillary extending to vertical from middle of eye: slipping for most part under preorbital. There are two scarcely visible pores on chin; no barbels. Premaxillary teeth in two series, the outer series conical, sharp, very much enlarged, but not truly canine-like, and rather widely set; the inner series small and conical. Mandibular teeth also in 2 series, the inner enlarged, closely set, while the outer teeth are conical and small. Vomer and palate edentate. Eye large situated in anterior half of head, its lower margin below the level through commencement of mouth cleft. Preopercular limb finely serrated. Operculum ending in two flat spines, not extending beyond membrane. Gillrakers of moderate length, rather closely set, 5+11 on anterior arch, all distinctly visible, longest slightly longer than filaments, and contained 2.4 times in eye diameter. Pseudobranchiae. Branchiostegals 7. Mouth cavity white; branchial cavity dark. Spinous dorsal incised by a deep notch, the fourth or fifth spine longest: its base being about half soft dorsal base. Anal short, its first spine minute second anal spine slender, slightly longer than first anal ray. Anal commences below 11th dorsal ray; caudal more or less squarely cut, without evidence of median point behind. Scales on snout, interorbital space, cheek, opercles, thorax, and anterior part of abdomen cycloid: nape, back and sides of body, and tail covered by ctenoid scales: 2 or 3 series of small, cycloid scales forming a sheath covering base of soft dorsal and anal. The same kind of scales cover base of caudal also. Membrane of soft dorsal and anal entirely devoid of scales. A large pointed axillary scale at base of ventral. Vertebrae 25.

Spinous dorsal dusky with diffused dark specks, becoming darker terminally; an indistinct blotch on opercle; other fins pale; no blotch or bands on body.

One specimen, 168 mm. to base of caudal, with well developed eggs, collected from Swabue, Kwangtung.

(To be continued.)

**STUDIES ON CHINESE HYDROZOA. II. REPORT ON SOME
COMMON HYDROIDS FROM THE EAST SADDLE ISLAND¹**

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The material upon which this report is based was collected from the East Saddle Island of the Chushan Islands (齐山群島, 櫟山) during the summer of 1936. Fifteen species belonging to thirteen genera in seven families have been recognized. Specific descriptions and figures have been given for each species. The species studied are included in the following list:

GYMNOBLASTEA

Fam. **Eudendriidae**

Eudendrium pusillum var. *amoyicum* Hargitt

Fam. **Corynidae**

Coryne pusilla Gaertner

Fam. **Tubularidae**

Tubularia mosembryanthemum Allmen

CALYPTOBLASTEA

Fam. **Campanularia**

Campanularia flexuosa (Hincks)

Campanularia sp.

Clytia minuta (Nutting)

Orthopyris platycarpa Bale

Obelia gracilis Calkins

Fam. **Hebellidae**

Hebella sp.

Fam. **Sertularidae**

Sertularia indivisa var. *bidentata* n. var.

Sertularia miurensis var. *pungens* Stechow

Symplectoscyphus horzawai Stechow

Thuiaria tubuliformis (Marktanner-Turneretscher)

Fam. **Plumularidae**

Plumularia setaceoides Bale

Lylocarpus nuttingi Hargitt

GYMNOBLASTEA

Hydroida without hydrothecae or gonangia. Gonophores when free usually furnished with eye-spots, gonads on wall of manubrium (Torrey).

¹ Contribution No. 10 from the Marine Biological Laboratory, Department of Biology, National University of Shantung, Tsingtao.

EUDENDRIDAE

Eudendrium Ehrenberg

Trophosome.—Colony often profusely branched; rising from a creeping stoloniferous hydrorhiza; stem usually regularly annulated. Hydranth with trumpet-like proboscis, with a single whorl of filiform tentacles at base.



Fig. 1. *E. p.* var. *amoyicum*,
portion of colony.

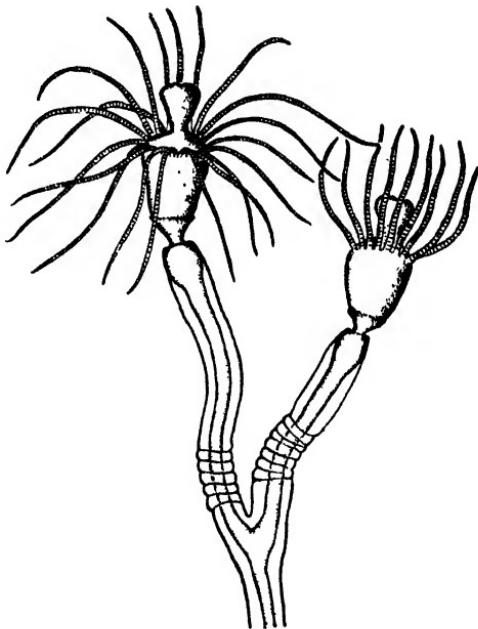


Fig. 2. *E. p.* var. *amoyicum*,
hydranths.

Gonosome.—Male gonophores forming clusters of bead-like filaments around the base of hydranth. Female gonophores appear singly, clustered around the base of hydranth.

***Eudendrium pusillum* var. *amoyicum* Hargitt (fig. 1, 2, 3)**

Eudendrium pusillum var. *amoyicum* Hargitt, 1927, Bull. Mus. Comp. Zool. 67 (16). 500, pl. 1, fig. 1

Trophosome.—Colonies attaining a height of about 15-20 mm.; with a creeping hydrorhiza; hydrocaulus rather erect, fascicled, with many side branches more or less regularly distributed. Annulation usually confined to proximal ends of branches and pedicel, with usually 3-6 rings at base of each branch. The number of rings may be as many as 8. Hydranth subvasiform-shaped with trumpet-shaped proboscis, which is almost half as long as the length of the body of the hydranth. Tentacles slightly longer than hyrauth, about 16-22 in number.

Gonosome.—Only male gonophores were observed. They are found mostly at the basal portion of colony. Gonophores 2-3-chambered, mostly borne on tips of pedicels around the body of aborted hydranths. Clusters of gonophores may also occur on short pedicels arising singly from the main stem. Hargitt's description of the female gonophores is as follows: "They arise on the body of hydranths as in many well-known species, and as a result, the polyps early atrophy as in other species, in many cases leaving the gonophores in clusters on the terminus of branches. Another type appears to arise singly on short pedicels of branches as is also common in other species."

Coloration.—Main branches of hydrocaulus deep brown, side branches pale brown, hydranths and gonophores pinkish.

Locality and Date.—Colonies of this species were found attached to dead oyster shells in a tide pool, in close association with Bryozoa and algae, on June 10, 1936, East Saddle Island (舟山群島, 嵊山).

CORYNIDAE

Coryne Gaertner

Trophosome. Colony simple or branched. Hydranth elongated with capitate tentacles irregularly scattered.

Gonosome.—Gonophores are sporosacs borne on short pedicels scattered irregularly on the body of hydranth.

Coryne pusilla Gaertner (fig. 4, 5)

Coryne pusilla Johnston, 1847, British Zoophytes 1:39; Inaba, 1890, Zool. Mag. Tokyo, pl. 1, fig. 1-4; Stechow, 1923, Jour. Coll. Sci. Imp. Univ. Tokyo, 44(art 8): 2.

Trophosome.—Colony about 30 mm. high with distinct, well developed creeping hydrorhiza. Hydrocaulus irregularly branched. Perisarc of stem and branches densely ringed especially at their proximal ends. Perisarc thick and rigid, ends abruptly behind the hydranth. Hydranths slender, spindle-shaped, measuring about 2 mm. long and 0.5 mm. wide with about 25 slender knobbed tentacles, arranged in 3-4 imperfect whorls. Tentacles near oral region usually have larger knobs than those around the proximal region. Tentacular knobs contain nematocyst cells. Main stems measuring about 0.3-0.4 mm. in diameter, side branches only about 0.2 mm.



Fig. 3. *E. p. var. amygdalicum*, male gonophores.

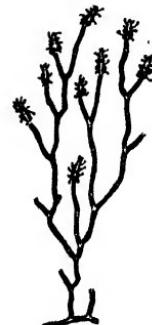


Fig. 4. *C. pusilla*, colony.

Gonosome.—Gonophores located at basal half of hydranth. In fully grown hydranth 16-20 big gonophores and about as many smaller ones mingle together. Two gonophores of different stages are usually connected at base. Gonophores are globular in shape with short stems and average about 0.25 mm. in diameter. Eggs uncertain in number, usually 6-8, borne at tip of stem surrounded by very thin spore sac.

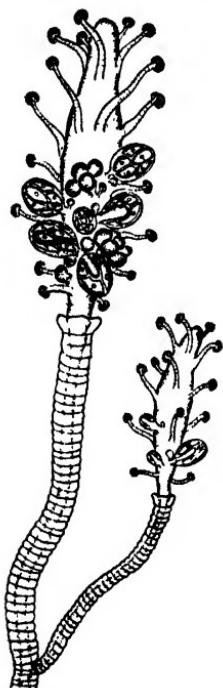


Fig. 5. *C. pusilla*, hydranths with gonophores.

Coloration.—Hydrorhiza and hydrocauli brown, hydranth pale creamy, gonophores light brownish.

Locality and Date.—Numerous colonies were found growing on rocks and barnicles in tide-pool on the shore of the East Saddle Island (舟山群島、嵊山), May 5, 1936.

TUBULARIDAE

Tubularia Linnaeus

Trophosome. Hydrocaulus simple or branched, rising from a creeping stoloniferous or reticulate hydrorhiza. Hydranth with two whorls of filamentous tentacles, a basal and an oral whorl.

Gonosome.—Gonophores arranged in pendant clusters or raceme-like masses, attached by peduncles to the hydranth body between the two whorls of tentacles. The medusoid never detached from the body of hydranth. Young embryos are liberated as actinulae.

Tubularia mesembryanthemum Allman (fig. 6, 7)

Tubularia mesembryanthemum Hargitt, 1927, Bull. Mus. Comp. Zool. 67 (16) : 494-495.

Trophosome.—Colony large, hydrorhiza reticular in structure. Hydrocaulus simple, rarely branched, erect, measuring 25-45 mm. high; perisarc rather delicate, densely ringed at base, occasionally so at about middle and only sparingly annulated at tips, with a distinct expansion when joining the hydranth. Hydranth large, flask-shaped, situated at the summit of the hydrocaulus, with the usual two series of tentacles. The tentacles of the basal whorl are filiform, long (about 6 mm. in length when fully extended) and tapering, about 25-30 in number. The tentacles of the oral whorl are much shorter, tapering and about 20 in number.

Gonosome.—Medusoids grouped in raceme-like clusters, borne on short pedicels arising from the body of hydranth between the two whorls of tentacles. There are about 20 clusters in a full grown specimen. Actinulae may be clearly seen through the thin sporosac. Medusoid barrel-shaped, quite elongated.

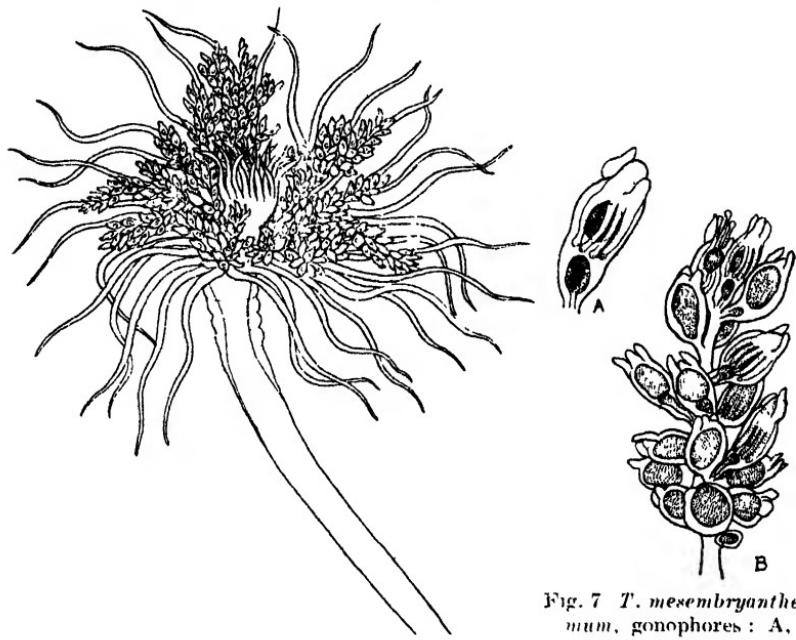


Fig. 6. *T. mesembryanthemum*, hydranth carrying gonophores

Fig. 7. *T. mesembryanthemum*, gonophores : A, actinula within sporosac; B, cluster of sporosacs.

Coloration.—Hydrorhiza and hydrocauli creamy, hydranth light red, gonophores pinkish.

Locality and Date.—Many colonies were collected from the East Saddle Island (舟山群島, 蠕山), June 1936.

CALYPTOBLASTEA

Hydriida with true hydrothecae and gonothecae. Gonophores when free usually with otoecysts; gonads on radial canals (Torrey).

CAMPANULARIA Campanularia Lamarck

Trophosome.—Colony branched or unbranched; stem simple or fascicled. Hydrothecae campanulate.

Gonosome.—Gonophores are sporosacs.

Campanularia flexuosa (Hincks)

Campanularia flexuosa Hincks, 1868, A History of the British Zoophytes, p. 168; Nutting, 1901, U. S. Fish. Comm. Bull. for 1899, p. 348; Nutting, 1915, Spec. Bull. U. S. Nat. Mus. pt. 3, p. 45-46.

Trophosome.—Colony short, only about 8-10 mm. in height, arising from a creeping stolon found growing upon shells of dead oysters or barnacles, in close association with sponges and Bryozoans. Hydrocaulus very rarely branched, zigzag in form, giving rise to very short pedicels at each flexure, 3-5 rings present at base of each internode. Pedicels short, measuring less than 0.5 mm. in length, each with 2-5 rings, arising from the main stem at an angle of approximately 30 degrees. Hydrothecae cup-shaped, nearly conicle, margin smooth, sides slightly bulging, almost straight sometimes, slightly longer than wide, measuring about 0.8 mm. long and 0.6 mm. wide at aperture. Diaphragm distinct, with slight inclination. Hydranths with long trumpet-shaped proboscis surrounded by a whorl of about 20 tentacles.

Gonosome.—Gonothecae borne on short pedicels consisting of 3-4 rings, conicle-shaped, widest at aperture, smaller than hydrothecae, measuring about 0.4 mm. long and 0.3 mm. at orifice. Blastostyle thick, usually with a group of 4-10 medusoids attached to it.

Locality and Date.—Numerous colonies of this species were collected from the East Saddle Island (鞍山, 青子坑), May 6, 1936. All colonies were found in close association with various sponges.

Campanularia sp. (fig. 8, 9)

Trophosome.—Colony consists of numerous unbranched pedicels rising from a creeping network of hydrorhiza, reaching as high as 8 mm. Pedicel with irregular spiral annulation throughout the entire length, annulations are especially distinct at both ends of the pedicel, periderm rather thick. Hydrothecae bell-shaped, borne at tip of a distinct subglobular segment at end of pedicel, longer than wide, side smooth, bell margin without dentation but turned slightly downward; periderm rather thin, greatly thickened just beneath the hydranth; basal chamber distinct, almost twice as broad as high. Hydranth large, proboscis trumpet-shaped, tentacles thick, about 20 in number.

Length of hydrotheca 0.46-0.5 mm.

Width of margin of hydrotheca 0.36-0.4 mm.

Thickness of periderm of

hydrotheca 0.006-0.007 mm.

Thickness of periderm of pedicel 0.009-0.01 mm.

Gonosome.—Gonothecae rising singly from hydrorhiza, compressed slightly, moderately large, egg-shaped, sides smooth, with a very

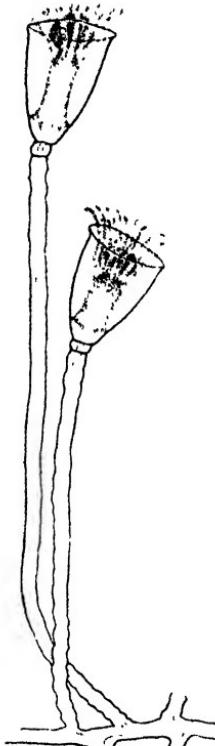


Fig 8 *Campanularia* sp., colony.

short stalk, which is provided with 1-2 annulations; operculum small, smooth, without neck.

Length of stalk of gonothecea ... 0.16-0.18 mm.

Width of stalk of gonothecea ... 0.09-0.12 mm.

Length of gonothecea 1.00-1.10 mm.

Width of gonothecea (widest part) 0.65-0.70 mm.

Locality and Date.—Numerous colonies of this species were collected from the East Saddle Island (懸山, 潤州海). May 19, 1936, found attached to shells of barnacles.

Clytia Lamouroux

Trophosome.—Colonies simple or with branched stems, rising from stoloniferous hydrorhiza. Hydrothecae usually with toothed margin and borne on long pedicel. Hydranth with trumpet-like proboscis.

Gonosome.—Gonangia containing gonophores which produce bell-shaped medusae with 4 radial canals, 4 tentacles and 8 lithocysts.

Clytia minuta (Nutting) (fig. 10, 11)

Campanularia minuta Nutting, 1901, Bull. U. S. Fish. Comm. for 1899, p. 345.

Clytia minuta Nutting, 1915, Spec. Bull. U. S. Nat. Mus., pt 3, p. 61; Hargitt, 1927, Bull. Mus. Comp. Zool. 67(16) 503.

Trophosome.—Colony unbranched or sparingly branched, reaching as high as 8 mm., rising from a creeping stolon growing on algae, side branches never paired. Pedicels slender and long, deeply annulated at both ends, annulations occurring also at middle of pedicel, side branches deeply annulated at base. Hydrothecae subconical, about twice as long as broad at orifice, sides smooth; margin of orifice with ten sharp teeth, basal chamber varies from subquadrate to about twice as long as broad; diaphragm present, simple but distinct. Hydranth rather small, proboscis trumpet shaped, with about 16 tentacles.

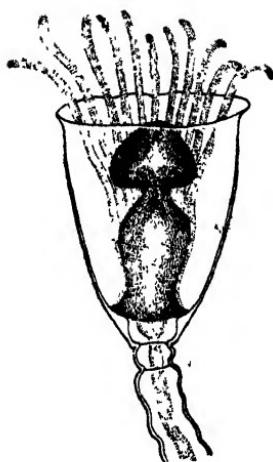


Fig. 9. *Campanularia* sp., hydranth.

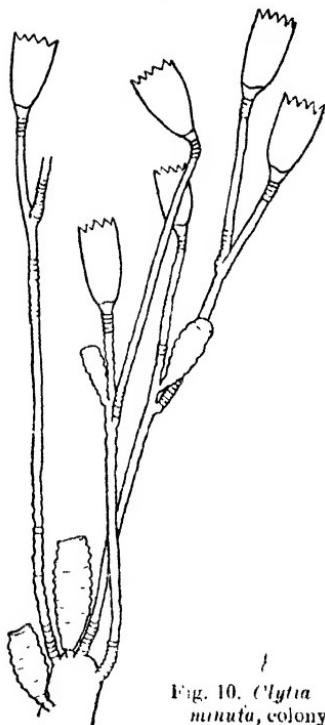


Fig. 10. *Clytia minuta*, colony.

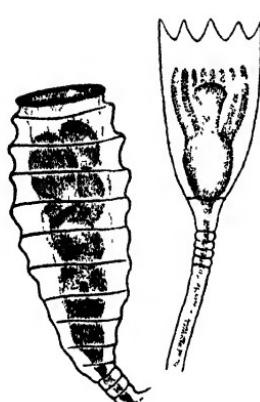


Fig. 11. *C. minuta*, hydranth and gonosome.

Length of hydrotheca 0.65-0.7 mm.
Width of orifice 0.36-0.4 mm

Gonosome. — Gonothecae rising either from stolon or from stem, subopposite to the side branches, with very short peduncle, elongate ovate, about 3 times as long as broad, deeply and regularly annulated; orifice truncate.

Length of gonotheca 0.65-0.75 mm.
Width of gonotheca 0.28-0.3 mm.

Locality and Date. — Colonies were found in close association with Bryozoans growing on barnacles. Collected from the East Saddle Island (東山, 黃陸塊), July 1, 1936.

Orthopyxis Agassiz

Trophosome. — Colony unbranched, pedicel long, rising from a creeping root-like hydrorhiza. Hydrotheca cup-shaped with greatly thickened periderm

Gonosome. - Gonothecae ovoid or compressed. Medusae borne on blasto-styles, without tentacles or manubrium.

Orthopyxis platycarpa Bale (fig. 12, 13)

Orthopyxis platycarpa.
Steckow & Uchida, 1931, Sci.
Rept., Imp. Univ. Tohoku, ser.
4, 6 (3) : 548-549, fig 2

Trophosome. — Colony consists of numerous unbranched pedicels rising from creeping root-like hydrorhiza growing on algae. Pedicel with very thick periderm, regularly and spirally annulated throughout the entire length and with a distinct globular ring just below the hydrotheca. Hydrotheca bell-shaped, margin smooth, without any dentation, periderm extremely thick, basal chamber globular.

Fig. 12. *O. platycarpa*, habit sketch.

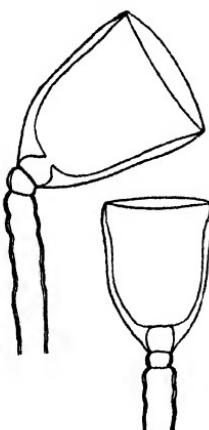
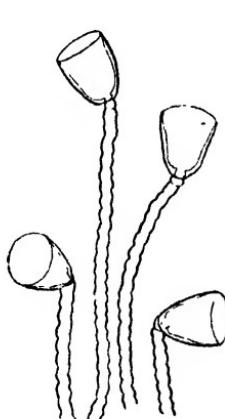


Fig. 13. *O. platycarpa*, hydrothecae.

Height of hydrotheca	0.4 - 0.6	mm.
Width of margin of bell	0.3 - 0.4	mm.
Thickness of periderm of hydrotheca	0.035-0.04	mm.
Thickness of periderm of pedicel	0.01 - 0.012	mm.

Gonosome.—Not seen.

Locality and Date.—Numerous colonies were collected from the East Saddle Island (嵊山, 黃陸嘴), July 20, 1936.

Obelia Peron & Lesuer

Trophosome.—Colony branched, plant-like, stem single or fasciated, arising from stoloniferous hydrorhiza. Hydrothecae campanulate, margin even or toothed, diaphragm present. Hydranth typical with somewhat trumpet-shaped proboscis.

Gonosome.—Gonangia borne on hydrocauli, side branches, or even on hydrorhiza; oblong ovate in shape, terminal aperture present. Medusae disk-like, with four radial canals, manubrium present. Medusae disk-like, with four radial canals; manubrium with four lips; marginal tentacles eight or more; lithocysts eight; oral tentacles absent.

Obelia gracilis Calkins

Obelia gracilis Calkins, 1899, Some Hydroids from Puget-Sound, p. 353; Nutting, 1915, Spec. Bull. U. S. Nat. Mus., pt. 3, p. 78; Hargitt, 1927, Bull. Mus. Comp. Zool. 67(16) : 504.

Trophosome.—Colony erect, rising from a creeping net-like hydrorhiza, reaching a height of 10-12 mm., simple, very rarely branched. Stems flexuose, divided into internodes, giving off pedicels at the bends. Three distinct annulations are usually present at the base of each internode. Pedicels mostly in pairs, only occasionally single, alternate in position. When pedicels are present in pairs both members of each pair are given off from the same side of the stem. The two pedicels of each pair are unequal in length, the shorter one is less than half the length of the hydrotheca, with 3-4 annulations, the longer one is about $2\frac{1}{2}$ times longer than the hydrotheca, with 3-4 annulations at each end. Hydrothecae large, campanulate, with smooth margin and a well defined diaphragm which is always obliquely situated. The hydrothecae borne on the shorter pedicels are larger than those borne on the longer ones.

Gonosome.—Gonotheceae borne on pedicels, never more than one to each internode; elongated club-shaped, apex either truncate or with an indistinct collar.

Locality and Date.—Numerous colonies of this species were found attached to barnacles from the East Saddle Island (嵊山, 鷓鴣), July 6, 1936.

HEBELLIDAE

Hebella Allman

Trophosome.—Colony unbranched, pedicels short, rising from a creeping hydrorhiza, parasitic on other hydroids. Hydrothecae elongate campanulate, with distinct diaphragm. Hydranth with conical hypostome.

Hebella sp. (fig. 14)

Trophosome.—Colony parasitic, growing on plumularian hydroid as a creeping root-stalk, mostly along the main stem of the host, and only occasionally invading the side branches. Hydrocaulus simple, slightly sinuous in its course. Hydrothecae alternate, regularly scattered on pinnæ. Pedicels of hydrothecae short, with 2 or 3 heavy oblique annulations, measuring about 0.35-0.38 mm. in length and 0.13-0.15 mm. wide. Hydrothecae large, urceolate in shape, more than twice as long as broad, with one side more concave

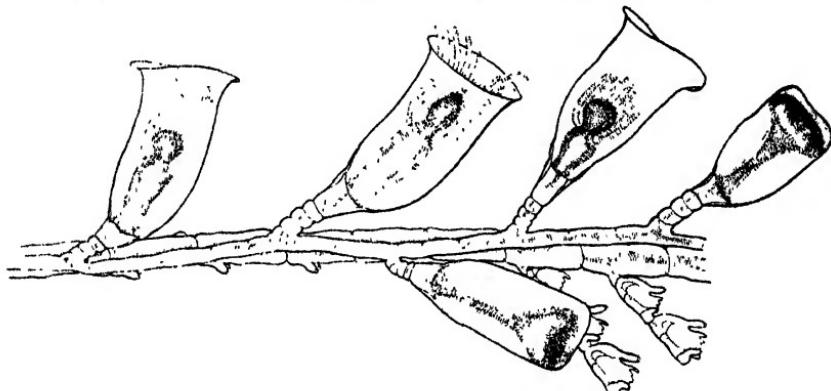


Fig. 14. *Hebella* sp., colony growing on *Lytocarpus*.

than the other, margin smooth, distinctly flaring and slightly sinuous. Diaphragm distinctly present at the bottom of the hydrotheca, basal cavity small and narrow, longer than wide. Hydranth small, occupying about half the cavity of the hydrotheca when completely retracted; hypostome conicle; tentacles moderate in length and size, about 18 in number.

Length of hydrotheca 1.0-1.1 mm.

Width of margin of hydrotheca 0.58-0.6 mm.

Locality and Date. Specimens of this species were collected from the East Saddle Island (鰲山, 黃陵嘴), July 1936.

Remarks.—The specimens studied show strong resemblance to *Hebella parasitica*, but due to lack of literature and specimens for comparison the question of its specific identity awaits further confirmation.

(To be concluded.)

**SOME TORTOISE BEETLES FROM HAINAN ISLAND
(COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE)¹**

By J. LINSLEY GRESSITT

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Museum, Lingnan University.*

During the summer of 1935 the writer made a personal collecting trip² to the Island of Hainan, south of the Chinese mainland, for the purpose of collecting insects and other natural history specimens. This paper constitutes the first report on the beetles collected, and enumerates the cassidids or tortoise-beetles with descriptions of the new species. The collection includes a few hundred specimens of eighteen species, five of which are considered to be new to science. This is the first report on Cassidinae from Hainan Island, so all the records are new. The types are deposited in the United States National Museum in Washington, D. C., and in the California Academy of Sciences in San Francisco; the paratypes are in the writer's collection.

Tribe **Priopterini**

Genus **Prioptera** Hope, 1840

1. Prioptera maculipennis reducta n. subsp.

Female.—Body ovate, distinctly broadened posteriorly; strongly but not regularly convex; elytra uneven, closely and irregularly punctured on disk. Color testaceous, elytral disks subochraceous, a large squarish black spot on explanate margin of each, extending from edge to a short distance up side of disk, and a smaller subrounded spot on each near suture at about level of posterior borders of marginal spots, a few small black punctures on side of disk behind humerus of each; last two antennal segments black, preceding ones testaceous; head darker than prothorax, slightly duller than elytral disks; articulating dentate margins of elytra and prothorax narrowly black; ventral surface of body entirely yellowish or reddish testaceous or transparent, anterior portion of prosternum reticulated like explanate borders of pronotum and elytra.

Head smooth, shining, impunctate on posterior portion of occiput, narrowly grooved from between antennal bases to behind posterior borders of eyes, some finer striae and small punctures between the groove and edges of eyes. Antennae short, hardly reaching to base of pronotum, strongly compressed beyond basal third; second and third segments shorter than fourth and following,

¹ Contribution from Lingnan Natural History Survey and Museum.

² See Gressitt: Notes on Collecting in Hainan Island with Data on Localities, *Lingnan Science Journal* 15(3) : 465-470, 1936.

somewhat bead-shaped; last segment about twice as wide as thick, one-half again as long as wide, two-thirds again as long as penultimate segment; basal segments minutely and sparsely punctulate, apical segments closely striate-punctate. Prothorax fully twice as broad as long, strongly emarginate anteriorly; sides rounded and narrowed anteriorly; basal margin strongly sinuate; postero-lateral angles slightly less than right angles; surface of disk convex and smooth, a slight cavity in front of scutellum; explanate margins smooth; edges thickened. Scutellum rounded-triangular, finely grooved near each side. Elytra as broad as prothorax at base, gradually broadened till about middle, broadly rounded posteriorly; explanate margins broadest before middle of side, moderately narrow posteriorly; disk uneven, irregularly and rather densely punctured, with two subsinuate costae, some of the punctures in parallel rows near suture; punctures deeper posteriorly; a rather large depression behind and to the side of post-scutellar hump at suture, another depression on each, behind and exterior to former; explanate margins impunctate. Metasternum largely smooth; femora micro-punctulate. Length 10.5; breadth 7.4—7.6 mm.

Male.—Shorter and broader, sides suddenly widened behind humeri, broadest before middle. Length 9.4; breadth 8 mm.

Holotype, female (United States National Museum), Ta Hian, alt. 600 meters, near Five Finger Mountains, south central Hainan Island, June 15, 1935, J. L. Gressitt; allotopotype, male, June 12, and two paratypes, females, Ta Hau, alt. 175 meters, west central Hainan, July 5 to 7, 1935, in writer's collection.

Differs from *P. maculipennis* Boheman, of Nepal and Assam, in being larger, in lacking the anterior pair of black spots on each elytron and black coloring on the metasternum, and in having the elytra as broad as prothorax at base.

2. *Prioptera multipunctata* n. sp.

Broadly ovate, widest near middle; moderately, and rather evenly convex; elytra densely and irregularly punctured. Color dull testaceous with small black spots, moderately shining, prothorax more so than elytra; explanate margins only a little paler than rest of surfaces, reticulate and but slightly transparent; elytral disks darker than pronotal disk, almost ochraceous; antennae with apical three segments entirely black, seventh and eighth segments brownish-black; sixth brownish apically, basal ones testaceous; head dirty testaceous, eyes pale blue-green; pronotum with a small round black spot at middle of either side of disk, slightly closer to base than apex, basal margin very narrowly black at either side; elytra with basal margin similarly black, surface marked with four black spots on each elytra as follows: (1) one on either side of suture near scutellum, slightly larger than pronotal spots, (2) a smaller, oblique spot on side of disk of each, behind humeri, (3) a still smaller,

rounded dot on either side of suture two-fifths elytral length from apex, and (4) a narrow marginal spot on each placed a little anterior to postero-lateral angles; ventral surfaces and legs testaceous except for blackish mesepimera, posterior portion of metasternum and part of sides of femora.

Head smooth and shining, deeply furrowed between eyes, with some depressions on either side of groove and one on each side of occiput behind eyes. Antennae thick, particularly beyond middle, cylindrical basally and flattened apically, short, reaching to about scutellum above or middle of metasternum below; last segment as long as two preceding combined; second and third short, subequal; basal segments sparsely punctulate, subglabrous, apical ones densely striate-punctulate, sparsely setose. Prothorax more than twice as broad as long, broadly emarginate anteriorly, strongly sinuate basally; sides rounded and narrowed anteriorly; disk smooth and impunctate, separated from explanate sides and anterior border by a groove, slightly depressed in front of scutellum. Scutellum a little longer than broad, narrowed and rounded apically, impunctate. Elytra slightly broader at base than prothorax, slightly broadened a short distance behind humeri, broadest at about middle; edge of explanate margins strongly thickened; disk of each closely and deeply punctured in about fourteen to twenty irregular rows, more densely so beyond basal third; middle with three indefinite concave areas, the anterior one oblique and behind humerus; explanate margins very narrow apically. Abdomen minutely punctulate. Length 7.4 mm.; breadth 5.4.

Holotype (loan deposit, California Academy of Sciences), Ta Hau, alt. 175 meters, west-southwest of Nodoa, western Hainan Island, July 4, 1935, J. L. Gressitt.

Differs from *P. decemstillata* Boheman, of Assam, in being narrower, and in having several apical antennal segments black, the elytra spots much smaller, the sutural angles not black, the pronotum impunctate and the elytra lacking costae. Differs from *P. decemmaculata* Boheman in being more oblong, less broadened posteriorly, and in having the pronotum impunctate, the scutellum broader behind, the elytral spots smaller, etc.

Genus *Calopepla* Hope, 1840

3. *Calopepla leayana insulana* n. subsp.

Oblong-oval, moderately convex, depressed above. Body yellowish testaceous; elytra deep metallic green, sometimes slightly bronzy or bluish-green; antennae with basal six segments ochraceous, the seventh dull brown or black and the last four pitch-black, sometimes the basal segments reddish-brown; eyes golden-brown to dark brown; postocciput sometimes dark brown; articulating basal margins of pronotum, proepimeron and mesepisternum narrowly black; scutellum amber-colored; tarsi brownish-black above; claws reddish.

Head circular above, indistinctly punctured, grooved from between antennal insertions to beyond middle of occiput, two low irregular tubercles on each side between groove and eye; clypeus raised, obtusely angulate above. Antennae reaching to about base of pronotum or posterior borders of middle coxae, broadened and flattened in apical half, nearly glabrous; second and third segments subequal in length, bead-shaped, shorter than fourth and fifth, which are likewise subequal, and nearly cylindrical; basal segments sparsely punctulate, apical segments closely but very finely punctate-striate. Prothorax a little broader than basal margin of elytra, less than twice as broad as long, obtusely emarginate anteriorly, with a strong rounded lobe projecting posteriorly over base of scutellum; sides convex at basal angles, narrowed anteriorly and rounded at apical angles; lateral and anterior margins separated from disk by a deep furrow which becomes shallower and broader at middle of anterior border; disk moderately convex, deeply grooved along mid-line to center of posterior lobe, slightly depressed transversely before lobe; surface finely and sparsely punctured. Scutellum longer than broad, narrowed and angulately rounded apically; sides raised basally. Elytra three-fifths as broad as long, slightly wider at middle than at base, broadly rounded posteriorly; margins rather slightly expanded horizontally; disk deeply punctured, in long rows near suture and irregularly so at sides, with raised costae: two parallel ones near suture, diverging exteriorly at base, and three lateral ones, the middle one of these indistinct along its middle portion, with numerous transverse or sinuous raised connections between costae. Intercoxal process of prosternum broad; metasternum finely striate laterally; abdominal segments wrinkled at sides; femora finely punctulate. Length 11—13 mm.; breadth 6.8—7.5.

Holotype (United States National Museum), Ta Hau, alt. 175 meters, western Hainan Island, July 4, 1935; four paratotypes in Gressitt collection, and additional paratypes from Ta Hian, alt. 600 meters, near Five Finger Mountains, south central Hainan, June 19, 1935, J. L. Gressitt; one paratype from No Kyu Chun, central Hainan, March 22, 1936, and another from Nga Hon Tung, central Hainan, March 2, 1936, taken by my native collector.

Differs from typical *C. leayana* (Latreille) in being smaller, with the basal six antennal segments testaceous, the thoracic and abdominal sternites not edged or tinged with black and the elytra with the margins hardly more bluish than the rest of the surface.

Tribe Aspidomorphini

Genus **Aspidomorpha** Hope, 1840

4. **Aspidomorpha dorsata** (Fabricius)

Cassida dorsata Fabricius, Mant. Ins. 1: 64, 1787 (Siam).

Three specimens were collected: one at Ta Hian, alt. 600 meters, south central Hainan, June 17; one at Nodoa, alt. 270 meters, west

central Hainan, July 16; and one at Dwa Bi (Tai Pin), alt. 250 meters, central Hainan, July 25, 1935.

5. **Aspidomorpha furcata** (Thunberg)

Cassida furcata Thunberg, Nov. Ins. Spec. 5 : 87, pl. 5, fig. 96, 1789.

Many examples are in the collection, representing the following localities: Fan Ta, alt. 320 meters, west central Hainan, June 3; Ta Hian, June 15; Ta Hau, July 8; Dome Mountain, southwest of Nodoa, July 13; Chung Kou, east of Nodoa, alt. 300 meters, July 19; Dwa Bi (Tai Pin), alt. 350 meters, central Hainan, July 20; Hoihow, alt. 20 meters, N. Hainan, July; Liamui, alt. 370 meters, east central Hainan, Aug. 1, 1935.

6. **Aspidomorpha fuscopunctata** Boheman

Aspidomorpha fuscopunctata Boheman, Monogr. Cassid. 2 : 298, 1854.

Three specimens were collected: one at Ta Hian, south central Hainan, June 17, the others at Liamui (Leng Moon) eastern Hainan, July 31 and August 1, 1935.

7. **Aspidomorpha miliaris** (Fabricius)

Cassida miliaris Fabricius, Syst. Ent. : 91, 1775.

Eight specimens represent this species; the localities are Ta Hian, June 19; Ta Hau, western Hainan, July 4; Dwa Bi (Tai Pin), central Hainan, July 25; and Liamui, eastern Hainan, July 31 to August 3, 1935.

8. **Aspidomorpha sanctae-crucis** (Fabricius)

Cassida sanctae-crucis Fabricius, Ent. Syst. 4 : 446, 1792.

This species is represented by a great many examples, taken at Nodoa, alt. 280 meters, west central Hainan, May 31 to June 1, and June 28; Ta Han, alt. 750 meters, central Hainan, June 7; Ta Hian, alt. 600 meters, south central Hainan, June 11 to 17; Ta Hau, alt. 180 meters, western Hainan, July 5 to 7; Dome Mountain, southwest of Nodoa, July 13; Vo Lau, between Nodoa and Ta Hau, July 9; Fan Ta, alt. 310 meters, southeast of Nodoa, July 17; Chung Kou, alt. 300 meters, east of Nodoa, July 19; Dwa Bi (Tai Pin), alt. 350 meters, central Hainan, July 22, Liamui (Leng Moon), alt. 360 meters, eastern Hainan, July 31 to August 3, 1935. This was the largest, and most abundantly found, species collected on the island.

Genus **Laccoptera** Boheman, 1855

9. **Laccoptera vigintisexnotata puncticollis** n. subsp.

Reunded triangular in outline; profile convex, gradually declivitous anteriorly and abruptly so posteriorly. Color pale yellowish on explanate margins, except for a long black oblong spot at each postero-lateral angle; disks of prothorax and elytra darker testaceous, the former nearly ochraceous, both spotted with black; entire surface shining. Head testaceous; eyes black; antennae reddish-

testaceous on basal seven segments, last four blackish-brown, apex of last brownish or black; pronotal disk with six black spots: four small rounded ones form an anteriorly convex arc, the middle two slightly anterior to middle of disk, two posterior ones larger, oval and transverse, close to base and separated a little more than middle anterior pair; scutellum orange-testaceous; elytral disks with a large common broadly Y-shaped spot immediately behind scutellum, and each with four or five small subrounded spots of different sizes close to basal margin, a large, oblique lateral band extending from side of humerus to a little behind middle of disk, two very small spots, one behind other, on first costa next to suture near middle, a larger spot followed by a smaller one, both touching suture, on posterior declivity; black oblong on postero-lateral part of explanate margin extending up on side of disk for a distance equal to width of explanate margin; ventral surface of body testaceous.

Head sparsely punctured on clypeus, which is raised and broadly rounded-triangular, finely grooved between antennal insertions and eyes. Antennae reaching to base of metasternum, moderately slender to beyond middle, apical five segments broadened and strongly compressed; basal segments very sparsely and briefly setose and sparsely punctulate, apical segments densely, though briefly, hairy and closely punctulate. Prothorax transversely oval, less than twice as broad as long, strongly convex anteriorly, narrowed and rounded at sides; explanate margins transparent and coarsely reticulate; disk not very smooth, irregularly punctured and slightly vermiculose on sides and base, minutely and sparsely punctured anteriorly; a transverse groove crossed by a feeble longitudinal one near base. Scutellum broadly triangular with a central depression. Elytra broader than pronotum, broadest just behind humeral angle, gradually narrowed to postero-lateral angles, broadly rounded posteriorly; explanate margins narrowest at suture; suture raised behind scutellum; disk with about ten rows of deep, often transverse, punctures, separated by longitudinal costae, diverging exteriorly before middle, as well as some transverse costae. Metasternum fairly smooth; abdomen somewhat vermiculate at sides, distinctly punctured on last segment. Length 9—9.4 mm.; breadth 7.2—7.6.

Holotype (United States National Museum), Ta Hian, alt. 600 meters, near Five Finger Mountains, south central Hainan Island, June 11, 1935, J. L. Gressitt; paratype (Gressitt collection), Ta Han, alt. 750 meters, central Hainan, June 23, 1935.

Differs from typical *L. vigintisexpunctata* Boheman, of Assam, Burma, Malacca, Sumatra and Tongking, in being smaller, relatively broader anteriorly, with the pronotum rougher and punctate, the antennae longer, the basal spots broken up, the post-scutellar marks fused, the obliquely placed lateral spots coalesced, the median sutural spots divided, etc.

10. **Laccoptera quadrimaculata bohemani** Weise

Laccoptera bohemani Weise, Verh. Naturf. Ver. Brünn 48: 42, 1910 (S. China).

A moderately large series of specimens was taken at the following localities: Ta Hian, alt. 600 meters, June 17; Ta Hau, alt. 180 meters, western Hainan, July 5 to 8; Chung Kon, alt. 300 meters, west central Hainan, July 19; and Liamui (Leng Moon), alt. 360 meters, east central Hainan, August 1 and 2, 1935.

Tribe Coptocyclini

Genus **Thlaspida** Weise, 189911. **Thlaspida japonica** Spaeth ?

Thlaspida japonica Spaeth, Suppl. Ent. 3 · 17, 1914 (Japan; N. China).

Several specimens were taken at Ta Hian, alt. 600 meters, June 15; Ta Han, alt. 750 meters, June 21–23; and Ta Hau, alt. 180 meters, western Hainan, July 7, 1935. These specimens differ slightly from examples from farther north, and may possibly represent a subspecies. This new Hainan record represents the southernmost known distribution for the genus.

Genus **Metriona** Weise, 189612. **Metriona circumdata** (Herbst)

Cassida circumdata Herbst, Natursyst. Kafer 8: 268, pl. 132, fig. 11, 1799.

Five specimens were collected: one at Nodoa, alt. 280 meters, west central Hainan, June 28; one at Ta Hau, alt. 190 meters, west of Nodoa, July 6; two at Dome Mountain, southwest of Nodoa, July 12 and 13; and one at Liamui (Leng Moon), alt. 350 meters, east central Hainan, August 2, 1935.

13. **Metriona thais crucifera** (Kraatz)

Coptocycla crucifera Kraatz, Deutsche Ent. Zeitschr. 23: 271, 1879 (Japan).

Two examples were taken: one at Nodoa, alt. 280 meters, west central Hainan, July 11, the other at Dwa Bi (Tai Pin), alt. 350 meters, near Loi Mother Mountain, central Hainan, July 25, 1935.

14. **Metriona** sp. ?

Five specimens were taken: two at Ta Hian, June 17–19; two at Ta Hau, western Hainan, July 4–6; and one at Dome Mountain, southwest of Nodoa, July 13, 1935. This series will very likely prove to represent a new species.

Tribe Cassidini

Genus **Cassida** Linnaeus, 175815. **Cassida cuticula** n. sp.

Moderately small; broadly oval in outline, slightly broader in front than behind; profile strongly convex, steeply declivitous

posteriorly; elytra distinctly broader than prothorax. Color testaceous; subochraceous on pronotum, metasternum and central parts of abdominal segments, pale yellowish on inner third and lateral border of each elytral disk, and very pale, transparent and reticulate on explanate margins of prothorax and elytra; eyes black; last antennal segment very slightly darkened.

Head rounded oval, very minutely punctulate; clypeus somewhat bell-shaped, slightly raised, obtusely angulate above, emarginate below; eyes narrowly elliptical. Antennae reaching nearly to middle of metasternum, slender basally and flattened and slightly broadened apically; scape fully three times as long as broad; second segment nearly as long as third and thicker than it and following few; third to fifth subequal, longer than sixth; last nearly twice as long as tenth; basal segments glabrous, apical ones finely and briefly setose. Prothorax transversely oval, three-fifths again as broad as long, evenly convex anteriorly, narrowly rounded at sides, feebly sinuate along base, with a broad and short lobe at middle covering base of scutellum; disk feebly convex, smooth and shining, practically impunctate; posterior lobe with a feeble transverse depression at its base. explanate margins of almost equal width throughout; edges feebly raised. Scutellum small, triangular, nearly as broad as long, subacute apically; surface smooth, but concave in center. Elytra broader than prothorax at base, humeral angles subacute and projecting forward to slightly beyond level of middle of sides of prothorax, sides broadened behind humeral angles to about middle and at first gradually narrowed posteriorly; apical portion broadly rounded; explanate margins broad at sides and about one-half as wide at sutural angles as at humeri, declivitous at an angle of about 45 degrees at sides and about 30 degrees behind, impunctate and radially corrugated internally; disk even, but rather deeply punctured in ten subparallel rows, the interstices raised, the outermost inter-area broadest, puncture-rows diverted exteriorly at base, innermost one dichotomously branching behind scutellum, punctures of second and fourth rows irregularly distanced and those of third row more widely spaced in central portion. Metasternum fairly smooth; abdominal sternites punctured and in part finely rugulose; femora indistinctly punctured. Length 5 mm.; breadth 4.1.

Holotype (loan deposit, California Academy of Sciences), Ta Han, alt. 750 meters, near Red Mist Mountain, central Hainan Island, June 7, 1935, J. L. Gressitt.

Differs from *C. obtusata* Boheman, of Formosa, Philippines, South China and India, in being a little larger, less narrowed posteriorly at sides, more convex in profile, with the explanate margins impunctate, the humeral angles more prominent and the ventral surface entirely testaceous.

16. *Cassida obtusata* Boheman

Cassida obtusata Boheman, Monogr. Cassid. 2 : 405, 1854.

A single specimen of this species was taken at Dome Mountain (Sa Ko Lia), alt. 500 meters, southwest of Nodoa, west central Hainan, July 12, 1935.

Genus **Chirida** Chapuis, 1896

17. **Chirida bowringii** (Bohemian)

Coptocycla bowringii Boheman, Mongor. Cassid. 3:123, 1855 (Hongkong).

Four examples were collected: one at Ta Hian, alt. 600 meters, June 18; one at Ta Hau, alt. 750 meters, central Hainan, June 24; one at Chung Kon, alt. 300 meters, July 19; and one at Dwa Bi (Tai Pin), alt. 350 meters, July 24, 1935.

18. **Chirida punctata** (Weber)

Cassida punctata Weber, Observ. Ent. 1: 51, 1801 (Sumatra).

A large series was taken, representing the following localities: Ta Hian, June 11-17; Ta Hau, alt. 180 meters, western Hainan, July 4 and 5; Dome Mountain, southwest of Nodoa, July 12 and 13; Fan Ta, alt. 320 meters, southeast of Nodoa, July 17; Chung Kon, alt. 300 meters, east of Nodoa, July 19; Dwa Bi (Tai Pin), alt. 350 meters, central Hainan, July 20 to 30; Liamui, alt. 360 meters, east central Hainan, August 1 and 2, 1935. J. L. Gressitt; and No Kyu Chun, central Hainan, March 22, 1936, taken by my native collector.

海南島之龜形甲虫（鞘翅目：金花虫科：龜形葉虫亞科）

嘉理思著

嶺南大學自然博物採集所

(摘要)

文中描述海南龜形甲虫共十八種，計屬新種與亞種者有：

Eriopelta maculipennis subsp. *reducta*, *P. multipunctata*, *Calopepla leayana* subsp. *insulana*, *Laccoptera rigintiscaenotata* subsp. *puncticollis*, 及 *Cassida cuticula*.

CHINESE TINGITIDAE (HEMIPTERA)

By CARL J. DRAKE

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This paper contains notes on 101 specimens of Tingitidae from South China kindly sent the writer by Professor W. E. Hoffmann of the Lingnan Natural History Survey and Museum, Lingnan University, Canton, China. The collection, including the types of the two new species described below, is deposited in the Lingnan Natural History Survey and Museum. Paratypes of the new species are in the collection of the author.

***Serenthia gibba* (Fieber)**

One male—Hoihow Kiung-shan District, Hainan Island, collected by W. E. Hoffmann. All records in the literature seem to refer to types collected in the East Indies. This specimen agrees very well with Fieber's figure and original description.

***Monanthia seorsa* Drake and Poor**

Five specimens—Linchow, Lien District, Kwangtung, Aug. 15, 1934, taken by F. K. To.

***Trachypeplus chinensis* Drake and Poor**

Many specimens—Nodoa, June 26, 1935; Ta Hau, July 8, 1935; and Sam-ah-Kong, Yai District, Jan. 30, 1935. Two examples—Chung Hang, Honan Island, Canton.

***Perissonemia borneensis* (Distant)**

One female—Yaoshan (mountain range), Lien District, Kwangtung, April 27-28, 1934, collected by F. K. To.

***Nobarnus hoffmanni* sp. nov.**

Head black, shining; hind pair spines appressed, moderately long, testaceous; median spine short or absent, when present testaceous and directed forward. Bucculae mostly testaceous, contiguous in front. Rostral laminae testaceous; rostrum brownish, extending beyond middle of mesosternum. Body beneath brownish-black. Legs slender, yellowish-brown, the tarsi dark. Antennae long, yellowish-brown, the distal half of terminal segment dark; segment I stouter and a little less than twice as long as II; III long, nearly two and a half times as long as IV; IV equal to length of first two conjoined.

Pronotum moderately convex, coarsely pitted, brownish, sharply tricarinate; lateral carinae nearly straight and parallel, slightly diverging anteriorly, faintly bowed inward in front. Paranota

narrow, testaceous, uniserrate behind, slightly broader and biseriate in front. Hood testaceous, low, rather long, faintly produced forward in front. Elytra testaceous, with brown to fuscous markings; costal area rather broad, mostly biseriate, uniserrate sometimes for a short distance between the base and middle, with two or three transverse nervures before the middle infuscate; subcostal area broader, four or five areolae deep in widest part, the aerolae small, the nervelets, except at base and apex, brown to fuscous; discoidal area short, not reaching middle of elytra, distinctly triangular in outline, bounded by a prominently raised nervure, the veinlets brown to fuscous. Outer margins of paranota and elytra indistinctly serrate. Genital segment broad in male, the claspers strongly curved.

Length, 3.30 mm.; width, 1.20 mm.

Holotype (male), allotype (female) and 3 paratypes, Honan Island, Canton, P'an-yu District, 1936, W. E. Hoffmann. Named in honor of Professor W. E. Hoffmann, who has taken a very active interest in the insect fauna of China, and in building up the Natural History Museum of Lingnan University. The generic position of this species is open to question. In general aspects it resembles members of the genus *Campsenta* Stål but differs in the characters of the pronotum, hood and discoidal area. The genus *Nobarnus* is not clearly defined by Distant and needs to be redescribed from the genotype.

Jannaeus togularis Drake and Poor

Two specimens—Dome Mountain and Ta Hau, Hainan Island.

Phyllontochila erosa (Fieber)

One example—Shung-shen District, Kwangsi Province, Aug. 5-6, 1934, Chauncey Brownell.

Phyllontochila toi sp. nov.

Form, size color and markings very similar to *P. philippinensis* Distant, but separated from it by the smaller and more narrowed hood at crest (pointed at crest in type), black pronotum, more elongate triangular process, and the outer margin of paranota with three broadly rounded, incurved areas. Pronotum black, very coarsely and deeply pitted; carinae longer than in *philippinensis*. Body beneath black. Rostrum long, extending beyond middle of metasternum; laminae dark, not meeting behind. Wings longer than abdomen, fumose. Legs brownish-black.

Length, 6.10 mm.; width 3.40 mm.

Holotype (male), allotype (female) and one paratype (female), Canton, P'an-yu District, Honan Island, collected by F. K. To in whose honor the insect is named. The paranota are narrowly

expanded as in *philippinensis*. *P. toi* n. sp. is much smaller and narrower than *P. perakensis* Distant from the Malay Peninsula. It is also much smaller than *P. erosa* Fieber.

Hormisdas vicarius Drake

Many specimens—P'an-yu District, Honan Island, Canton, Oct. 12, 1931, W. E. Hoffmann; Lien District, Linchow, Kwangtung, July 6, 1932, W. E. Hoffmann.

Stephanitis nashi Esaki and Takeya

Many specimens—P'an-yu District, Honan Island, Canton, Oct. 11, 1936, W. E. Hoffmann.

Stephanitis gallarum Horvath

One female—Yaoshan (mountain range), Lien District, Kwangtung, April 24-25, 1934, F. K. To.

Stephanitis ambigua Horvath

Seven examples—P'an-yu District, Honan Island, Canton, March-December 1936, W. E. Hoffmann and F. K. To.

Stephanitis typicus Distant

Seven specimens—P'an-yu District, Canton, 1936. W. E. Hoffmann; 1 example—Barker Road, Victoria, Hong Kong, Aug. 6, 1934, Y. W. Djou.

華產之花編蟲科(半翅目)

狄力基著

美國衣阿華

(摘要)

文中發表華南之花編蟲十三種，分隸九屬。經研究之標本凡一〇一，現存嶺南大學自然博物採集所。中以 *Nobarnus hoffmanni* 及 *Phyllotochila toi* 為新種。

NEW MEMBRACIDAE FROM SOUTH CHINA

By W. D. FUNKHOUSER

University of Kentucky.

A rather extensive collection of Membracidae from South China recently received from Professor William E. Hoffmann, Director of the Lingnan Natural History Survey and Museum, Lingnan University, Canton, contains eight new species and a number of very interesting new records of geographical distribution.

These are here described and recorded. The types of the new species are deposited in the above mentioned museum.

1. *Anchon lineatus* sp. nov. (fig. 1)

A small brown species with wide-spreading suprumerals, characterized by hyaline tegmina with a brown spot at internal angles and by a white tomentose stripe extending from base of suprumerals across the base of the scutellum to the lateral margin of tegmina.

Technical description: Head convex, subquadangular, twice as wide as high; base arcuate; eyes globular; ocelli large, prominent, amber-colored, equidistant from each other and from the eyes and situated well above a line drawn through centers of eyes; inferior margins of genae sinuate; clypeus extending for half its length below inferior margins of genae, tip rounded.

Pronotum dark brown, finely punctate, sparingly pubescent; metepidium convex, about as broad as high; median carina percurrent; humeral angles triangular, blunt; suprumeral horns strong, laminate, flattened dorso-ventrally, as long as the distance between their bases, tips broad and irregularly tridentate; posterior process strongly angulate, a tooth in front of the elbow, posterior extension straight in the female and distinctly curved in the male, base high above the scutellum, tip sharp and reaching to a point about halfway between internal angles and tips of tegmina; scutellum entirely exposed, broader than long, tip notched; a white tomentose line extends on each side from the base of the suprumerals to the tegmina, passing across the base of the scutellum.

Tegmina hyaline, entirely exposed; base narrowly coriaceous and punctate; a large irregular brown spot at the internal angle; tip pointed; apical limbus broad; five apical and two discoidal cells.

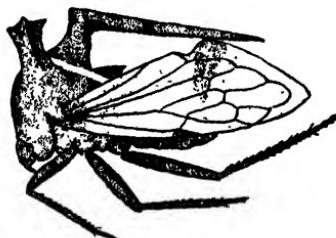


Fig. 1. *Anchon lineatus*
sp. nov.

Sides of thorax weakly white tomentose; undersurface of body brown; legs uniformly brown.

Length from front of head to tips of tegmina 5.8 mm.; width between tips of suprathumeral horns 4.4 mm.

Type: Female.

Type locality: Hupeh Province, Hwang-mei District, China. Collected by Y. W. Djou.

The males are considerably smaller than the females, with clearer tegmina and with curved posterior process.

Described from fifteen females and fifteen males from the following localities: Six females and two males from the type locality; eight females and six males from the Hainan Island; one female and five males from Kwangtung, Lien District; and two males from Hunan Province, Lam Mo District (collected by F. K. To).

Holotype, allotype and twenty-three paratypes in Lingnan University collection; five paratypes in author's collection.

2. *Leptocentrus terminalis* Walker

One specimen from Canton.

3. *Pantaleon brunneus* Funkhouser

One specimen from Fukien, Kien-yang District, and one from Kwangtung, Lien District.

4. *Maurya angulatus* Funkhouser

One specimen from Kwangtung, Lo Fau Shan, and one from Yunnan Province, both collected by E. R. Tinkham.

5. *Sipylus sericeus* sp. nov. (fig. 2)

Very small, brown, silky, finely punctate; body triangular; scutellum entirely concealed; head broadly quadrangular; tegmina hyaline; legs flavous.

Technical description: Head quadrangular, twice as broad as high, brown, finely punctate, sparingly pubescent; base arcuate; eyes light brown; ocelli small, amber-colored, inconspicuous, twice as far from each other as from the eyes and situated above a line drawn through centers of eyes; inferior margins of genae straight and sloping; clypeus broad, extending for two-thirds its length below inferior margins of genae, tip truncate and pilose.

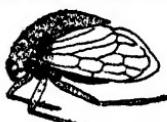


Fig. 2. *Sipylus sericeus* sp. nov.

Pronotum brown, finely punctate, sericeous with long golden hairs; metopidium sloping, broader than high; humeral angles well developed, triangular, blunt; no suprathumerals; median carina faintly percurrent; scutel-

lum entirely covered by sides of pronotum; posterior process short, triangular, weakly tectiform, tip acute and not quite reaching the internal angles of tegmina.

Tegmina hyaline; base narrowly brown, coriaceous and punctate; veins strong and slightly pilose; apical limbus broad; five apical and two discoidal cells.

Sides of thorax and undersurface of body dark brown; legs flavous.

Length from front of head to tips of tegmina 2.7 mm.; width between humeral angles 1.5 mm.

Type: Male.

Type locality: Honan Island, Canton, China.

Described from a single specimen taken by Professor Hoffmann on March 29, 1933. Type in Lingnan University collection.

6. *Gargara opaca* sp. nov. (fig. 3)

A small brown species recognized at once by the opaque tegmina.

Technical description: Head subquadrangular, broader than high, dark brown, finely punctate, weakly pubescent; base sinuate; eyes ovate, light brown; ocelli pearly, conspicuous, farther from each other than from the eyes and situated well above a line drawn through centers of eyes; inferior margins of genae straight; clypeus broad, projecting only slightly below inferior margins of genae, tip truncate.

Pronotum light brown, finely punctate, very sparingly pubescent; metopidium sloping, wider than high; median carina obsolete except on posterior process; humeral angles strong, acute, triangular; posterior process short, heavy, tip acute and reaching just to the internal angles of the tegmina. Scutellum well exposed on each side.

Tegmina brown, opaque, broad, veins prominent; base broadly coriaceous and punctate; tips rounded; apical limbus narrow; five apical and three discoidal cells.

Sides of thorax and undersurface of body dark brown; legs uniformly brown.

Length from front of head to tips of tegmina 4 mm.; width between humeral angles 2.2 mm.

Type: Female.

Type locality: Kwangtung, Meu-ming District, south China.

Described from a single female collected by Professor Hoffmann on July 13, 1932. Type in Lingnan University collection.



Fig. 3. *Gargara opaca*
sp. nov.

12. *Gargara nitidipennis* Funkhouser

Twenty-two specimens from Kwangtung and one from Hainan Island.

13. *Gargara pseudocornis* Funkhouser

Two specimens from Canton and two from Kwangtung.

14. *Gargara bicolor* Funkhouser

Seven specimens from Kwangtung.

15. *Gargara davidi* Fallou

One female from Canton taken on *Sapium sebiferum* (L.) Roxb.

16. *Tricentrus maculus* sp. nov. (fig. 6)

A robust black species with strong suprumerals and characterized particularly by the maculate apices of the tegmina.

Technical description: Head black, subquadrate, twice as wide as high, coarsely punctate, sparingly pubescent; base strongly arcuate; eyes dark brown; ocelli large, white, conspicuous, equidistant from each other and from the eyes and situated slightly above a line drawn through centers of eyes; inferior margins of genae rounded; clypeus extending for two-thirds its length below inferior margins of genae, tip rounded and pilose.

Pronotum black, coarsely punctate, sparingly pubescent; metopidium convex, about as wide as high; median carina percurrent; humeral angles strong, blunt, triangular; suprumeral horns tricarinate, as long as the distance between their bases, extending outward, upward and backward; posterior process straight, tricarinate, tectiform, apex sharp and extending just to internal angles of tegmina; scutellum well exposed on each side.

Tegmina hyaline with the base broadly black, coriaceous and punctate and the apex deeply clouded with brown; veins strong, heavy and dark brown; apical limbus broad; five apical and two discoidal cells.

Sides of thorax, undersurface of body and femora black; tibiae and tarsi dark brown.

Length from front of head to tips of tegmina 6.4 mm.; width between tips of suprumeral horns 3.7 mm.

Type: Male.

Type locality: Kwangtung, Yang-shan District, south China.

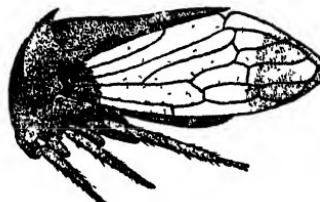


Fig. 6. *Tricentrus maculus*
sp. nov.

Technical description: Head quadrangular, twice as broad as high, finely punctate and densely pubescent with shining white hairs; base sinuate; eyes mottled brown; ocelli small, white, inconspicuous, farther from each other than from the eyes and situated above a line drawn through centers of eyes; inferior margins of genae sinuate and flanged; clypeus extending for more than half its length below inferior margins of genae, tip rounded and pilose.

Pronotum black, finely punctate, densely pubescent with short, glistening white hairs; metopidium convex, about as high as broad; humeral angles heavy, triangular, blunt; posterior process tricarinate, strongly ridged above, tip acuminate and reaching just beyond internal angles of tegmina; scutellum well exposed on each side.

Tegmina smoky-hyaline, much clouded at tip; base broadly black, coriaceous and punctate; tips rounded; apical limbus broad; veins prominent; five apical and two discoidal cells.

Sides of thorax and undersurface of body jet black; legs ferruginous.

Length from front of head to tips of tegmina 5 mm.; width between tips of humeral angles 2.3 mm.

Type: Male.

Type locality: Kwangtung, Lien District, south China.

Described from six males, five from the type locality and one from Canton, the former collected by F. K. To, the latter by Professor Hoffmann. The Canton specimen was taken in May 1933 and the others in August 1934. Type and three paratypes in the Lingnan University collection; two paratypes in author's collection.

Since all of the specimens are males, we are naturally suspicious that this may be the male of some species already described from the female, but we have in our collection both sexes of all described species from this region which at all resemble it, and it does not agree with any of them. We assume, therefore, that the female of this species has not yet been reported.

9. *Gargara lata* Funkhouser

Six males and one female from Kwangtung, Lien District.

10. *Gargara hainanensis* Funkhouser

One specimen from Hainan Island and one from Kwangtung.

11. *Gargara hoffmanni* Funkhouser

One specimen from Canton, one from Kwangtung, and two without locality labels but marked "No. 284".



Fig. 5. *Gargara tectiforma*
sp. nov.

7. *Gargara brunneifasciata* sp. nov. (fig. 4)

A large purplish-black species characterized by the conspicuous brown bands across the tegmina.

Technical characters: Head subquadrate, twice as wide as high, black, punctate, pubescent; base arcuate; eyes large, very light brown; ocelli large, conspicuous, amber-colored, farther from each other than from the eyes and situated above a line drawn through centers of eyes; inferior margins of genae rounded; clypeus extended for more than half its length below inferior margins of genae, tip rounded and pilose.

Pronotum purplish-black, finely punctate, sparingly pubescent; metopidium sloping, wider than high; median carina percurrent; humeral angles strong, triangular, blunt; no suprumerals; posterior process strong, straight, sharply keeled above at about the middle, then suddenly acute, the tip not quite reaching the internal angles of tegmina; scutellum well exposed on each side.

Tegmina hyaline with a broad brown transverse fascia behind the middle and another at the tip; base black, coriaceous and punctate; veins strong, yellowish; apex rounded; apical limbus broad; five apical and two discoidal cells.

Sides of thorax black with silvery pubescence; undersurface of body black. Femora black; tibiae and tarsi light brown.

Length from front of head to tips of tegmina 5 mm.; width between tips of humeral angles 2.4 mm.

Type: Female.

Type locality: Hainan Island.

Described from two females and four males, all collected at the type locality, five of the specimens collected by Professor Hoffmann and labeled "Ling-moon, 66 miles from Ting-on, April 23-24, 1932" and one collected by Mr. F. K. To in the Kiung-shan District of the Island. Type and three paratypes in the Lingnan University collection; allotype and one paratype in author's collection.

8. *Gargara tectiforma* sp. nov. (fig. 5)

A black, heavy-bodied species with a distinctly tectiform and strongly ridged posterior process and smoky tegmina. It is near *G. bicolor* Funkhouser but differs in the shape of the body, the structure of the posterior process and the character of the tegmina. *G. bicolor* is slender-bodied, the posterior process is not strongly carinate and the tegmina are clear.

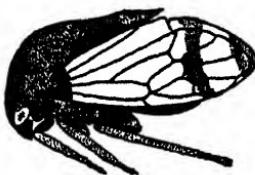


Fig. 4. *Gargara brunneifasciata* sp. nov.

Described from two males both taken at the type locality by Mr. F. K. To, one on August 13 and the other on September 29, 1934. Type in the Lingnan University collection; paratype in author's collection.

17. *Tricentrus ornatus* sp. nov. (fig. 7)

Large, light brown decorated with dark brown and black; suprathumeral strong, extending outward and slightly upward; posterior process reaching just beyond internal angles of tegmina; tegmina smoky-hyaline.

Technical description: Head shining black, finely punctate, very finely pubescent; subquadangular, broader than high; base strongly and gradually arcuate; eyes light brown mottled with dark brown; ocelli large, white, prominent, a little farther from each other than from the eyes and situated well above a line drawn through centers of eyes; inferior margins of genae sinuate; clypeus broad, extending for half its length below inferior margins of genae, tip rounded and pilose.

Pronotum light golden brown with large black triangular spots on the metopidium above the eyes, tips of suprathumeral and tip of posterior process black; metopidium convex, about as broad as high; median carina obsolete; humeral angles strong, triangular, blunt; suprathumeral strong, triquetrate, sharp, about as long as the distance between their bases, extending outward and slightly upward; posterior process straight, tricarinate, tectiform, tip sharp and black and extending just beyond internal angles of tegmina; scutellum well exposed on each side.



Fig. 7. *Tricentrus ornatus* sp. nov.

Tegmina smoky-hyaline, translucent; base broadly dark brown, coniacous and punctate; tip slightly clouded with dark brown; veins brown; apical limbus broad; five apical and two discoidal cells.

Sides of thorax dark brown with white tomentose pubescence; undersurface of body black; femora black; tibiae and tarsi light brown.

Length from front of head to tips of tegmina 5.5 mm.; width between tips of suprathumeral horns 4 mm.

Type: Female.

Type locality: Honan Island, Canton, China.

Described from two females, one from the type locality collected by Professor Hoffmann on June 9, 1933, and one from Hainan Island taken on June 2, 1932, by Mr. O. K. Lau. Type in Lingnan University collection; paratype in author's collection.

18. ***Tricentrus brevispinis* sp. nov. (fig. 8)**

Near *T. capreolus* Walker, but larger, with much smaller suprahumerals and a differently shaped head. Large, light brown, with very minute suprathumerales and a depressed posterior process which just reaches internal angles of tegmina; tegmina light brown, semiopaque, with base and tip brown.

Technical description: Head subquadrate, almost as high as wide, brown, finely punctate, densely pubescent; eyes dark brown, ovate; base highly arcuate and sinuate; ocelli large, pearly, slightly elevated, equidistant from each other and from the eyes and situated well above a line drawn through centers of eyes; inferior margins of genae sloping; clypeus extending for half its length below inferior margins of genae, tip rounded and pilose.

Pronotum light brown, finely punctate, densely pubescent with short golden hairs; metopidium sloping, wider than high; median carina faintly percurrent; humeral angles large, triangular, blunt, extending outward farther than the suprathumeral horns; suprathumeral horns very short, spinelike, sharp, not more than one-fourth as long as the distance between their bases, extending outward and upward; posterior process strong, heavy, tricarinate, tectiform, slightly depressed at tip which extends just to the internal angles of the tegmina; scutellum narrowly exposed on each side.

Tegmina brownish, semi-opaque, wrinkled; base broadly brown, coriaceous and punctate; tip narrowly brown; apical limbus very narrow; five apical and two discoidal cells.

Sides of thorax and undersurface of body dark brown; femora dark brown; tibiae and tarsi light brown.

Length from front of head to tips of tegmina 5.7 mm.; width between tips of suprathumeral horns 2.8 mm.

Type: Female.

Type locality: Kwangtung, Mei District, south China.

Described from a single female collected by F. K. To on July 19, 1933. Type in the Lingnan University collection.

19. ***Tricentrus capreolus* Walker**

Two females from Hainan Island.

20. ***Tricentrus curvicornis* Funkhouser**

Three females from Tai Kwong, Hunan Province (F. K. To); one male and one female from Kwangtung.

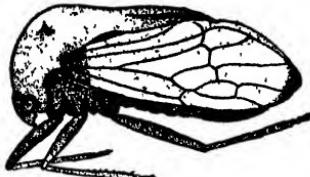


Fig. 8. *Tricentrus brevispinis*
sp. nov.

21. *Tricentrus fukiensis* Funkhouser

Seven specimens from Kwangtung and one from Tai Kwong, Hunan (F. K. To).

22. *Tricentrus allabens* Distant

Thirteen specimens from Canton, fifteen from Kwangtung, two from Hainan Island and two from Kuling Mountain, Kiangsi Province (Y. W. Djou).

23. *Tricentrus basalis* Walker

A long series consisting of ten males and eight females from Canton; thirty-two males and sixty-two females from Hainan Island; three males and ten females from Kwangtung; one female from Potung; and two females from Kwangsi, Yih-ning District.

This species, which is apparently one of the commonest membracids in south China, offers considerable difficulty in determination because of the fact that the males are smaller than the females and have very short depressed suprakumeral horns while in the females the horns are not only more erect but show great variation in length. However, a long series shows so complete, gradual and perfect gradation from one form to another in specimens from the same locality that we are unable to find any specific differences or even any characters which would seem to differentiate varieties.

24. *Tricentrus albomaculatus* Distant

Eight specimens from Canton, three from Kwangtung, and one from Hainan Island.

This species also shows considerable variation, especially in color, and the lighter colored specimens seem to be identical with material from the Hawaiian Islands.

25. *Tricentrus hyalinipennis* Kato

We are in some doubt as to our determination of this species since Kato's very meager and unsatisfactory description leaves much to be desired. The material from south China, however, agrees with the specimens which we have standing in our collection under this name.

26. *Tricentrus congestus* Walker

Two specimens from Canton.

27. *Tricentrus flavipes* Melichar

Two specimens from Canton, one from Hong Kong, six from Kwangtung, and one from Hainan Island.

28. *Tricentrus finitimus* Walker

Five specimens from Kwangtung.

華 南 角 蟬 科 之 新 種 誌
方 學 常 著
基 的 干 大 學
(摘要)

本文記述廿八種角蟬之分佈，計屬新種者有：
Anchon lineatus, *Sipylyus sericeus*, *Gargara opaca*, *G. brunneifuscata*,
G. tectiforma, *Tricentrus maculus*, *T. ornatus* 及 *T. brevispinis*
八種。所述各種之標本，現存嶺南大學自然博物採集所。

**PHERETIMA DIFFRINGENS (BAIRD) AND OTHER
ASIATIC PHERETIMA**

By G. E. GATES,
Judson College, Rangoon, Burma.

Many of the Japanese species of *Pheretima* have never been adequately characterized. This is especially true of some of the older species erected prior to 1900, but information also is needed with regard to certain important characteristics of the more recently erected species in order to make possible the construction of standard diagnoses or definitions. Until this information is available and standard diagnoses have been worked out, it will be unprofitable to attempt consideration of the relationship of the earthworm fauna of Japan with that of other parts of Asia. (*Vide* for instance: Chen 1933, p. 261, and 1936, p. 272, also Gates 1935, p. 13, on *P. yamadai*.)

In view of this situation the writer was glad to avail himself of an offer by Dr. G. T. Bowles of Harvard University to collect earthworms while on a short visit to Japan. Circumstances rendered the securing of extensive collections impossible and the small collection obtained from the vicinity of Tokyo comprises but two species of *Pheretima*. Although one is represented only by two juvenile individuals, specimens of the other are mature and in good condition and have enabled the recognition from Japan of one of the first named (and also the most widely distributed) species of the genus.

After the manuscript of this paper had been completed, Ohfuchi's study of Japanese octothecal species of *Pheretima* was received. To bring the present discussion of the octothecal species to date several changes necessitated by Ohfuchi's paper have been made.

The writer's thanks are extended to Dr. Bowles for his kindness in securing the Japanese worms.

***Pheretima diffringens* (Baird)**

- 1869. *Megascolex diffringens*, Baird, Proc. Zool. Soc. London, 1869, p. 40. (Type locality, Plas Machynlleth, North Wales. Types in the British Museum.)
- 1892. *Perichaeta nipponica*, Beddard, Zool. Jahrb. Syst. 6:760. (Type locality, "Japan". Types, if still in existence and recognizable, probably in the British Museum.)
- 1892. *Perichaeta indica*, Michaelsen, Arch. Natg. 58:241. (Japan.)
- 1898. *Perichaeta heteropoda*, Goto & Hatai, Ann. Zool. Jap. 2:69. (Type locality not designated. Types from Tokyo, Tokorosawa, Kamakura. Types?)
- 1937. *Pheretima heteropoda* + *P. nipponica*, Ohfuchi, Res. Bull. Saito Ho-en Kai Mus. 12:42 and 108.

1937. *Pheretima differringens*, Gates, Rec. Indian Mus. 39 : 198 (Diagnosis and distribution.)

Material Examined.—Thirty-seven clitellate and well preserved specimens collected in the vicinity of Tokyo, January 1937, by Dr. G. T. Bowles.

External Characteristics.—Length, to 105 mm. Diameter, to 5½ mm. Setae enlarged, especially ventrally, on the preclitellar segments. Setal formulae of 10 specimens selected at random shown below.

vi	vii	viii	xvii	xviii	xix	ii	ini	viii	xii	xx
9	10	13	18	12	17	18	24	39	42	49
9	10	12	16	14	16	22	24	36	38	46
8	10	13	16	14	16	22	23	33	40	45
10	10	14	17	14	17	17	23	38	46	50
8	15*	13	16	15	18	8§	22	37	44	46
9	14*	13	16	11	16	20	22	37	41	48
9	10	13	16	12	17	18	21	37	44	48
10	11	14	15	14	15	24	24	40	40	46
8	12	12	16	13	14	23	23	34	41	46
9	12	14	17	16	17	24	25	37	45	47

* Ventral setae smaller than usual.

§ Large gap in setal circle.

First dorsal pore on 11/12 (36 specimens) or 10/11 (1). Clitellum annular, extending from 13/14 to 16/17; intersegmental furrows, dorsal pores and setae lacking.

Spermathecal pores minute and superficial, four pairs on 5/6-8/9 (37). An unpaired female pore (37). Male pores minute and superficial, each pore on a disk-shaped porophore of shortly elliptical outline, transversely placed, in the setal circle of xviii. The male pores are recognizable as patent apertures on only a very few specimens and then only with high magnification and brilliant illumination (32 mm. objective and B. & L. adjustable lamp¹). On other worms the site of the pore can be recognized as a rather whitish spot though a patent aperture is not visible. That this spot is

¹ When minute structures require careful examination the illuminating device employed in this laboratory is a Bausch and Lomb adjustable microscope lamp fitted with a 108 watt, 6 volt, coil filament Mazda bulb. No equipment is available locally to test directly the candle power of this apparatus but the lamp showed 230 candle power when compared photometrically at 85 cm. distance with a 16 c.p. standard lamp at 22.5 cm. distance, from a Lummer-Brodhun photometer. Obviously the candle power afforded by focusing the light on an object ca 150 mm. from the lens of the lamp is much greater.

actually the site of the male pore can be proved by tracing the prostatic duct through the parietes. At or near the center of the male porophore is a small, nearly circular, but rather indistinctly delimited, greyish, translucent area. This area presumably contains the pores of the gland associated with the male porophore and is much more distinct and definite than on many Burmese specimens with which the Japanese worms have just been compared. The male pore is usually just lateral to the greyish spot.

Note.—In characterizing reproductive pores in *Pheretima* the terms minute, small and large are used. The spermathecal, female and male pores of *diffringens* are, roughly, of about the same size and are termed minute. Unless spermathecal pores are quite definitely larger and more readily recognizable than the female pore or larger than the spermathecal pores of *diffringens* or the male pores of *pingi* Stephenson 1925, the term minute is used. It should be recognized that "pore" refers only to the actual opening and not to the margin around the opening. A minute pore is definitely recognizable as an opening only under the high powers of the binocular. Although the site of a minute pore can be determined, the opening itself usually cannot be identified under the low power.

The spermathecal pores of *P. pingi* are of about the same size as on *diffringens* and hence are considered minute. The spermathecal pores of *pingi*, however, have been variously characterized: large, Kobayashi 1934, p. 2; rather large, Kobayashi 1936, p. 190; rather large, Ohfuchi 1937, p. 58; minute, Chen 1933, p. 231. Size of spermathecal pores, however, is not subject to such intra-specific variation as this disagreement would appear to indicate. The variation in characterization is probably due to the fact that actual pores have not been seen.

A similar disagreement prevails with regard to the location of the spermathecal pores of the same species postsetal on v-vii, Kobayashi 1934, p. 2; situated intersegmentally, Chen 1933, p. 231; on 5/6-8/9, Kobayashi 1936, p. 129, and Ohfuchi 1937, p. 58. The disagreement as to location is probably also not the result of intraspecific variation but due in part to failure to identify the actual pores and in part to lack of exact definition of "intersegmental furrow". For a definite restriction of the meaning of intersegmental furrow ride Gates 1937.

Genital markings small, slightly raised tubercles, symmetrically paired, presetal in position, about in *cd* or *c* or *d*, the preclitellar markings located as follows: on vii, viii and ix, 30 specimens; on viii and ix, 1 specimen; on vii and viii, 1 specimen; no markings, 5 specimens. Several specimens have markings in addition to those just mentioned as follows: one worm with paired markings on vii-ix has an extra pair of markings each on viii and ix, the extra markings just in front of the usual markings; another worm with markings on vii-ix has an extra pair of presetal markings on ix, the additional markings just in front of the usual markings; the worm with markings on viii and ix has an extra pair of presetal markings on viii, the extra markings just median to the spermathecal pore lines. Only two specimens have postclitellar markings; on each worm the postclitellar marking smaller than the male porophore, in contact with and crowded against the male porophore, on its posterolateral side.

Internal Anatomy.—Septum 8/9 is represented by a ventral rudiment only (37). The single heart of ix is on the left side in 21 specimens, on the right side in 9 specimens; a pair of hearts belonging to ix in 5 specimens; no hearts of ix present, 2 specimens. Hearts of x are lacking in 28 specimens; a pair of hearts belonging to x in 1 specimen, a single heart belonging to x and on the right side (large and filled with blood) in 2 specimens, on the left side in 5 specimens. In one worm there is an empty and unusually small heart belonging to x on the left side. All hearts of ix (and x, when present) pass into the ventral trunk (37). Last pair of hearts in xiii (37).

Note. In the absence of septum 9/10 it is possible to distinguish hearts of ix from those of x by the junction of the former with the ventral trunk in front of the testis sacs of x while the junction of a heart of x with the ventral trunk is posterior and just in front of 10/11. Dorsally of course the hearts of ix are connected with the dorsal trunk.

The testis sacs are unpaired and ventral (37), the sacs dorsal to the parietes, the nerve cord excluded. In 20 specimens the ventral blood vessel is included within the sac of xi and imbedded within the testicular coagulum. In a number of specimens the testicular coagulum of the sac of x is in two, discrete, spheroidal to ovoidal masses. Nevertheless there is but a single sac even though the roof and floor of the sac may be in contact at the median line. The ventral blood vessel seems to be attached to the roof of the sac but to bulge into the interior of the sac between the two masses of testicular coagulum. In other specimens the testicular coagulum is in a single, rather dumb-bell-shaped mass.

Note.—Michaelsen and Stephenson apparently have assumed, since the testes and male funnels are paired, that the testis sacs were originally paired. Thus Michaelsen refers to the sacs of a segment as "verwachsen" or "verschmolzen." Stephenson (1925, p. 891) referring to the testis sacs of x and xi says, "both pairs united across the middle line" (italics mine). There is no embryological or other evidence to show that testis sacs in the genus were originally paired and that from the paired an unpaired condition has arisen by union of the sacs of a segment. Actually in many species of *Pheretima* the testes and male funnels of a segment are in a single sac even though the sac may be more or less deeply constricted mesially in such a way as to produce more or less of a dumb-bell shape. Since there is but a single sac and nothing is known as to an origin from a paired condition there is no point in referring to an unpaired sac as a pair of sacs, united or joined. Although apparently subject to some variation, the condition of the testis sacs is of taxonomic importance and should be carefully studied and characterized as well as the relationship of the posterior sac or sacs to the seminal vesicles of xi. At present practically no information is available as to the relationship of the testis sac or sacs of Japanese *Pheretimas* to the seminal vesicles. In at least two Japanese *Pheretimas* the seminal vesicles of xi are included within the testis sac of xi: *P. sieboldi* (Horst) 1883, seminal vesicles in a tough-walled cylindrical testis sac (Gates 1937b.) and an unidentified sexthecal species mentioned on a subsequent page. A dry dissection is preferable to a dissection under water in determining characteristics of the testis sac. Very often it is necessary to open the testis sac from the dorsal side and remove the testicular coagulum in order to determine whether or not an unpaired sac is present.

Prostates are entirely lacking in 32 specimens. In these worms the posterior portion of the male deferent duct, in xviii, is thickened, with a slight (muscular?) sheen and bent into a "u" or a "U" shape. Four specimens have one or two rudimentary prostates, the glands thin, flat and bound against the parietes, confined to xviii. A fifth specimen has one small but well developed prostate that extends through xvii-xix.

The genital marking glands are shortly stalked and coelomic but with the stalks almost confined to the parietes. Bound to the parietes or actually imbedded within the longitudinal musculature and anterior to the ectal end of the prostatic duct is a single stalked gland (one on each side of the worm in each specimen). The stalk of this gland is composed of 3 or more distinct stalks and passes posteriorly into or deeper into the parietes just median to the ectal end of the prostatic duct to open to the exterior on the greyish, translucent spot on the male porophore. The glands are of about the same size regardless of the presence or absence of prostates.

The spermathecal duct is rather slender (relative to the thickness of the duct in many species). The shortly ellipsoidal to ovoidal seminal chamber is always filled by white material with no spermatozoal iridescence (37 specimens). One specimen has several small, vesicular outgrowths (parasitic?) on the stalks of each spermathecal diverticulum.

It is scarcely likely that a species so widely distributed throughout the world as is *diffringens* should be restricted to a single locality in Japan, and hence it would appear to be possible that the species has been described or listed from Japan under some other name. Before proceeding to a consideration of the status of other octothecal Japanese species it is necessary to point out that *P. diffringens* is very close to another Asiatic species of *Pheretima* with which it may be confused. In parallel columns below are given diagnoses of these two species, the diagnosis of *diffringens* based on the author's studies of the species, the diagnosis of *pingi* based on an unpublished study of Chinese specimens and the papers of Kobayashi and Chen on Korean and Chinese forms. (It will be noted that Ohfuchi's suppression of *pingi* as a synonym of *carnosa* is not accepted. *P. carnosa* is sexthecal and until the types have been examined and shown to be abnormal it scarcely seems justifiable to regard *carnosa* as an octothecal species. Furthermore the presetal, preclitellar genital markings of *carnosa* are on vii and viii while the same markings of *pingi* are restricted to viii and ix. The male porophores of *carnosa* as figured by Goto and Hatai (1899, p. 15) look like those of *P. iizukai* and *shimaensis* and the figures do not appear to be representations of the male porophores of *pingi*.)

P. diffingens

Spermathecal pores minute and superficial, 4 pairs, on 5/6-8/9.

Male pores minute and superficial, each pore on a disk-like porophore.

Genital markings paired and segmental, presetal, on vi-ix, in bc, cd, or just median to the spermathecal pore lines, postsetal on v-viii, and just in front of the spermathecal pores.

Setae : vi/6-11, vii/8-14, viii/10-16, xvii/13-18, xviii/9-16, xix/12-17, 21-28/ii, 21-28/iii, 26-36/vi, 35-42/viii, 39-45/xii, 42-52/xx

First dorsal pore on 11/12.

Length, 45-170 mm

Diameter, 2½-6 mm.

Segments, 90-119.

(Septum 8/9 represented by a ventral rudiment only.)

Intestinal caeca simple.

Hearts of x lacking.

Testis sacs unpaired and ventral.

Spermathecal diverticulum with slender stalk and small, shortly ovoidal to ellipsoidal seminal chamber.

Genital marking glands shortly stalked and almost confined to the parietes.

Distribution : China and Japan, widely spread, probably by man, throughout the world.

P. pingi

Ditto.

Postsetal, on v-viii, just in front of the intersegmental furrows.

Ditto.

Genital markings paired and segmental, presetal, on viii/ix, just lateral to the midventral line or just median to the spermathecal pore lines, postsetal on v-viii, just on front of the spermathecal pores.

Presetal on xviii, just lateral to the midventral line or just median to the male pore lines, postsetal on xviii and median to the male pore lines, presetal on xix and median to the male pore lines.

vi/10-17, vii/11-19, viii/14-22, xvii/17-26, xviii/14-24, xix/19-26, 24/ii, 24-33/iii, 33-42/vi, 44-53/viii, 54-62/xii, 57-69/xx.

12/13.

110-247 mm.

5-11 mm.

110-146.

Septum 8/9 complete but membranous.

Ditto.

(Present.)

Ditto.

Ditto, (except that the seminal chamber is slightly longer).

Genital marking glands sessile on the parietes.

China, Korea and Japan.

(Statements in parentheses are usually omitted from diagnoses as they indicate characteristics common to very large numbers of species.)

P. pingi is distinguished from *P. diffingens* by the segmental location of the spermathecal pores, the presence of postclitellar genital markings, the restriction of the presetal, preclitellar genital markings to viii and ix, the larger setal numbers, the posterior location of the first dorsal pore, presence of a complete septum 8/9 (observed by Stephenson 1925, Michaelsen 1931, Chen 1933 and

Kobayashi 1936, overlooked by Kobayashi 1934 and Ohfuchi 1937), and the presence of the hearts of x. In addition it may be pointed out that in *diffringens* the prostates are usually lacking and are often small or rudimentary when present while the prostates are present and well developed in *pingi*; there is a stalked gland passing to each male porophore in *diffringens* while such stalked glands have not been recorded from *pingi*; the male pore of *diffringens* is often eccentric, the pores of one or more stalked glands also present on the male porophore while the male pore is central in *pingi* and gland pores have not been observed on the male porophore.

Differences between the two species accordingly are almost entirely of degree. Though the spermathecal pores of *pingi* are segmental they are only slightly in front of the intersegmental furrows that bear the pores in *diffringens*. Genital markings may be lacking on specimens of both species, postclitellar genital markings may occasionally be present in *diffringens* (Michaelsen 1897, Gates 1926, Chen 1931), though apparently always limited to xviii, while postclitellar genital markings are often lacking in *pingi*; the setal numbers are smaller in *diffringens* but the largest numbers of *diffringens* overlap the smallest of *pingi*. The first dorsal pore is on 11/12 in *diffringens* but in variant specimens may be on 10/11 or 12/13, while the same pore in variant specimens of *pingi* may be on 11/12. One or both hearts of x may occasionally be present in *diffringens*, while the hearts of x may be small in *pingi* (Gates 1935, p. 14, Kobayashi 1936, p. 134, Ohfuchi 1937, p. 61, does not mention hearts.), or possibly (?) lacking entirely (Chen 1933, p. 232). The stalks of the genital marking glands of *diffringens* appear to be slightly coelomic but are so short as to be almost restricted to the parietes as in *pingi*. Septum 8/9 is represented by a ventral portion only in *diffringens* but is complete in *pingi* (said to be absent in Japanese forms, Ohfuchi 1937, p. 62). The absence of prostates is fairly general in *diffringens* but this is a characteristic which certainly appears, in the genus *Pheretima*, to be an abnormality (*vide* also the weak development of the prostatic duct and the indistinctness of the male pores).

Since most if not all of the differences between these two species are slight and of degree only, it may be necessary to consider if specimens referred to *diffringens* are in reality only more or less abnormal forms of *pingi*. Abnormality (if this word can be used) has not, however, been of such a nature as to prevent the species from establishing itself in the numerous and widely separated regions into which it has been accidentally transported by man or otherwise.

About the only definite distinction (not of degree) between the two forms is the presence or absence of a stalked gland in connection with the male porophore. (Perhaps it will be more accurate to regard the male deferent duct in *diffringens* as opening to the exterior on a genital marking.) Development of this stalked gland

may, however, be associated with an absence of prostates though no correlation between size of gland and of the prostates has been found in recently studied specimens of *diffringens*. (A supposed correlation between size of glands and rudimentary condition or absence of prostates, Gates 1931, p. 389, has been lacking in more recently studied specimens.)

Inasmuch as the differences between *diffringens* and *pungii* are numerous (though slight and of degree only, except for the association of stalked glands with the male porophores) and since it appears to be possible to refer any particular individual definitely to one or the other of the two species, these forms may be allowed to stand for the present at least. It is obvious however that caution is necessary in referring specimens to one or the other of two such closely related forms.

The following octothecal Japanese species with spermathecal pores on 5/6-8/9 have simple intestinal caeca²: *divergens* (Michaelson) 1892, *fuscata* (Goto & Hatai) 1898, *grossa* (Goto & Hatai) 1898, *heteropoda* (Goto & Hatai) 1898, *indica* (Michaelson 1892), *marenzeli* Cognetti 1906, *micronaria* (Goto & Hatai) 1898, *nipponica* (Beddard) 1892, *shimensis* (Goto & Hatai) 1899, *yamizoyamensis* Ohfuchi 1935, and *oyamai* Ohfuchi 1937.

P. divergens can be distinguished from *diffringens* only by the position of the first dorsal pore (of dubious value) and the spermathecal conformation which is also of little if any value since the spermathecae are probably aberrant. However, the short spermathecal duct and the shape of the diverticulum seem to indicate specific distinctness. The type of the species is abnormal (prostatae and spermathecae). Worms referred to *divergens* by Ohfuchi (1937) apparently are also all abnormal. Hence *P. divergens* cannot be adequately characterized at present. (It is obvious that a specific diagnosis or definition must be based on normal rather than abnormal specimens. (*Vide P. anomala* Gates 1937.)

P. fuscata is distinguished by the postclitellar genital markings, *grossa* by the larger size, the postclitellar genital markings and the

² *P. izukai* (Goto & Hatai) 1899 is (according to the authors) acacial. If this species is, as Ohfuchi (1937) maintains, actually caecal, then *izukai* would appear to be the same as *grossa*. Ohfuchi, however, distinguishes *izukai* from *grossa* by several characteristics such as size of the seminal vesicles, size of prostatae, size of genital marking glands, and a very slightly more median location of the genital markings. These characteristics, either individually or collectively, are not of sufficient importance to justify maintenance of two distinct species. Furthermore in *grossa*, according to Ohfuchi, the prostatae are small and confined to xviii, while according to Goto and Hatai the prostatae are in xv-xix. Similarly the prostatae of *izukai*, according to Ohfuchi, extend through 7 segments while in the types of *izukai* the prostatae are restricted to xviii. Therefore, even if differences in size of prostatae were of specific importance, the two species could not be separated by this characteristic.

convoluted spermathecal diverticulum; *marenzelleri* by the intersegmental preclitellar genital markings and the presence of 8/9 (but the type of this species is also abnormal); *micronaria* by the large male pores (?) and the postclitellar genital markings (the type of this species also abnormal); *shimaensis* by the larger size, greater numbers of setae, location of the first dorsal pore, the male pores, the postclitellar intersegmental genital markings and the "winding" spermathecal diverticulum; *yamizoyamensis* by the larger, intersegmental, postclitellar genital markings. *P. oyamai* though apparently distinct from *diffringens* is hard to distinguish since it is not fully characterized. The species is known only from abnormal forms (*vide* absence of spermathecal diverticula and prostates; absence of spermathecal diverticula is regarded for the present, at least, in the genus *Pheretima* as an abnormality).

P. heteropoda (Goto & Hatai) is characterized by the presence of four pairs of presetal genital markings on vi-ix. According to the figure (Goto & Hatai 1898, p. 69) these markings are about on the spermathecal pore lines a position for these markings which has not hitherto been noted for *diffringens*. Otherwise there are no differences from *diffringens*. Assuming that the figure is not quite exact and that the genital markings are slightly median to the spermathecal pore lines nothing remains to distinguish *heteropoda* from *diffringens*. *P. heteropoda* Ohfuchi 1937 is distinguished from (the usual forms of) *diffringens* by the smaller setal numbers of vi, viii and xx. In view of the variation in setal numbers that may be found within a species this difference is not in itself of sufficient value to indicate specific distinctness. Otherwise *P. heteropoda* Ohfuchi 1937 is quite clearly to be synonymized with *diffringens*.

Michaelsen (1892) gives but little information as to his specimens of *indica*. The "auffallend schwach" development of the prostates and mention of hearts only in xi-xiii suggests *diffringens* rather than *pingi*.

P. nipponica (Beddard) can be distinguished from *diffringens* only by the presence of the hearts of x. Since one or both hearts of x may be present occasionally in *diffringens* this cannot be considered of especial importance. The presence of presetal genital markings on vii shows that the specimens should not be referred to *pingi*. *P. nipponica* Ohfuchi 1937 is quite clearly to be synonymized with *diffringens*. (The spermathecae shown in fig. 36 appear to be abnormal. Such abnormal spermathecae have not been observed hitherto in *diffringens*. Worms with these spermathecae may possibly have to be referred to another species.)

In conclusion it must be admitted that the disposition of species and names above is based entirely on published accounts. This may be satisfactory in the case of recent names such as those of Ohfuchi (1937) even though information with regard to certain points is

lacking. The accounts of the earlier forms are much less complete and accordingly there is much less certainty with regard to the identification of the older specimens. Reexamination of types and material of these earlier forms is desirable but may not be possible. Michaelsen's specimens of *indica* may still be in existence. Beddard's types of *nipponica* may or may not be in existence or recognizable. Nothing is known as to the disposition of the types of Goto and Hatai's species.

Pheretima sp.

Material Examined.—Two anterior fragments of juvenile specimens from Tokyo, January 1937, collected by Dr. G. T. Bowles.

Diameter, 6 mm. Setae small and closely spaced: vi/13, vii/14, xvii/21, xviii/16, xix/21, 28/ii, 34/iii, 59/viii, 64/xii, 70/xx. First dorsal pore on 12/13 (2).

Spermathecal pores minute and superficial, three pairs on 5/6-7/8. Single female pore. Male pores minute and superficial. Each male pore located on an area of very slight epidermal modification that extends anteriorly to or towards 17/18, but with no definite genital markings or demarcated porophores.

The intestine begins in xv. The intestinal caeca are simple but with ventral margins slightly though definitely incised. Testis sacs unpaired, seminal vesicles and hearts included but not the nerve cord. The sac of x may be annular, that of xi annular or cylindrical. Spermathecae juvenile, the ampulla flattened and heart-shaped, about as long as the duct from which it is sharply demarcated. The diverticulum which passes into the anterior face of the duct at the parietes is shorter than the combined lengths of duct and ampulla and not differentiated into stalk and seminal chamber.

Remarks.—These specimens cannot be referred to any of the sexthecal species of Japan, at least at present.

References

CHEN, Y.

- 1933. A preliminary survey of the earthworms of the lower Yangtze valley. *Contr. Biol. Lab. Sci. Soc. China, Zool.* 9 : 177-296.
- 1936. On the terrestrial Oligochaeta from Szechuan II. *Contr. Biol. Lab. Sci. Soc. China, Zool.* 11 : 269-306.

GATES, G. E.

- 1926. Notes on earthworms from various places in the province of Burma, with descriptions of two new species. *Rec. Indian Mus.* 28 : 141-170.
- 1931. The earthworms of Burma. II. *Rec. Indian Mus.* 33 : 347-442.
- 1935. New earthworms from China, with notes on the synonymy of some Chinese species of *Drawida* and *Pheretima*. *Smithsonian Misc. Coll.* 93(3) : 1-19.
- 1937a. Indian earthworms. I. The genus *Pheretima*. *Rec. Indian Mus.* 39 : 175-212.

1937b. Notes on some species of *Diarida* and *Pheretima* with descriptions of three new species of *Pheretima*. *Bull. Mus. Comp. Zool.*, Cambridge, 80 :305-335.

GOTO, S., AND HATAI, S.

1893. New or imperfectly known species of earthworms. I. *Ann. Zool. Jap.* 2 :65-78.

1899. New or imperfectly known species of earthworms. II. *Ann. Zool. Jap.* 3 :13-24.

KOBAYASHI, S.

1934. Three new Korean earthworms belonging to the genus *Pheretima*, together with the wider range of the distribution of *Pheretima hilgendorfi* (Michaelsen). *Jour. Chosen Nat. Hist. Soc.* 19 :1-11.

1936. Distribution and some external characteristics of *Pheretima carposa* (Goto et Hatai) from Korea. *Sci. Rept. Tohoku Imp. Univ.* (4) 11 :116-138.

MICHAELSEN, W.

1897. Die Tereicolenfauna Ceylons. *Mitt. Nat. Mus. Hamburg* 14.

1931. The Oligochaeta of China. *Peking Nat. Hist. Bull.* 5(3) :1-24.

OHFUCHI, S.

1937. On the species possessing four pairs of spermathecae in the genus *Pheretima*, together with the variability of some external and internal characteristics. *Res. Bull. Saito Ho-on Ken Mus.* 12 :31-136.

STEPHENSON, J.

1925. Oligochaeta from various regions, including those collected by the Mount Everest expedition 1924. *Proc. Zool. Soc. London*, 1925 : 879-907.

Pheretima diffingens (Baird) 及其他東亞 *Pheretima* 屬
之蚯蚓

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(摘要)

根據內外兩解剖學之研究，對於 *P. diffingens* 之特徵，詳為述及。本研究係將上述品種與其他同屬之種類，尤以 *P. pingi*，作詳細之比較。在東京曾探得未長成者之殘片凡二，但終未能指定其與日本某成熟之品種類同。

A NEW TREMATODE (TREMATODA: LECITHODENDRIIDAE)
FROM THE FROG, *RANA RUGULOSA*

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In a previous paper on the parasites of frogs (Li, 1937), the description of a certain *Ganeo* sp. was omitted because of the lack of necessary literature. This paper is, therefore, a supplementary note. Among a hundred specimens of *Rana rugulosa* Wiegmann, 1835, examined, thirty-five were found to harbor this trematode parasite. The author takes pleasure in expressing his indebtedness to Dr. H. T. Chen for many suggestions and criticisms in the investigation.

Family **LECITHODENRIIDAE** Odhner, 1910

Subfamily **Pleurogenetinae** Looss, 1899

***Ganeo lingnanensis* n. sp. (fig. 1, 2 & 3)**

All measurements given below represent averages taken from ten mounted specimens.

Body flattened and oval, tapering anteriorly, and rounded off posteriorly, measuring 3.1 mm. long by 1.26 mm. at its greatest width. Cuticle armed with small spines directed backward which are more numerous at the anterior region, but become very few at the extreme posterior. Oral sucker subterminal, and transversely oval, measuring 0.175 mm. long by 0.128 mm. wide. Ventral sucker nearly spherical, measuring 0.216 mm. long by 0.191 mm. wide.

Mouth surrounded by oral sucker, and opening into a short thin-walled prepharynx measuring 0.023 mm. long, followed by a globular muscular pharynx, measuring 0.089 mm. in diameter. Oesophagus slender, 0.39 mm. long, bifurcating at about the anterior 1/5 of body length, a short distance in front of the anterior testis. The caeca extend slightly beyond vitellaria and are more or less swollen at the posterior tip.

Testes about spherical, somewhat obliquely placed one behind the other. Anterior testis on middle line of body, behind fork of intestine and measures 0.334 mm. in diameter; hind testis 0.351 mm. in diameter and on the right side of the ventral sucker with its posterior margin on the same level with the center of sucker. The right border of the hind testis usually overlaps the caecum in part, or occasionally goes beyond the caecum. Seminal vesicle U-shape, with a fairly long narrow tube into which it continues before it opens into the pars prostatica. The latter is a large, elongated

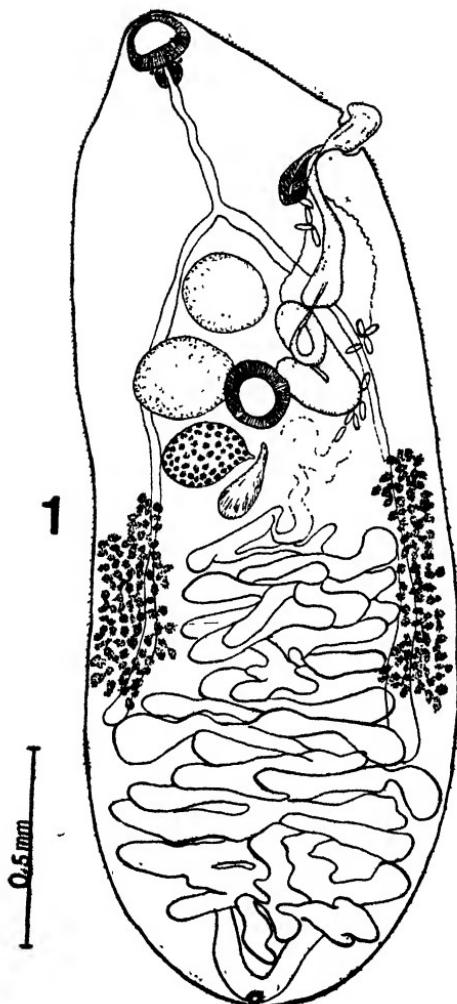


Fig. 1. *Ganeo lingnanensis* n. sp., ventral view.

unsymmetrical pestle-shaped chamber, measuring 0.312 mm. long by 0.109 mm. at its greatest width. A large number of conical prostate cells open into the pars prostatica. Cirrus conspicuous and measures 0.214 mm. long. Cirrus sac absent.

Ovary almost spherical, 0.253 mm. long by 0.214 mm. wide, located between the middle line of the body and the right intestinal caecum, and is almost completely behind the acetabulum. The oviduct arises from its left margin and soon receives the duct of the receptaculum seminis. The latter is flask-like and measures 0.216 mm. long by 0.117 mm. at its greatest width. It is situated behind the ventral sucker with its neck bent towards the right. Laurer's canal fairly conspicuous, 0.117 mm. long and arises from the neck of the receptaculum seminalis. The transverse vitelline ducts open into a prominent yolk reservoir situated near the median line closely behind

the acetabulum. Uterus passes posteriorly to the posterior end of the body and then takes an anterior course. Some of the coils are seen overlapping the intestinal caeca, and in well matured specimens the uterine coils may occupy nearly the whole area between the tips of the intestinal caeca and the posterior end of the body. Finally, the uterus is seen passing by the left side of the vesicular seminalis and dorsal to the pars prostatica. Metraterm very well

developed, muscular, and measuring 0.148 mm. long at the greatest width. The genital atrium has a depth of 0.109 mm. and opens to the outside on the left body margin at a level almost half way between the pharynx and the fork of the intestinal caeca, being closer, nevertheless, to the fork of intestine than to the pharynx.

The vitellaria lie mostly on the ventral surface of the intestinal caeca; they also surround the latter on the sides. They extend from the posterior border of the ovary to approximately half the distance between the ventral sucker and the posterior end of the body, and always terminate in front of the blind ends of caeca. The vitelline follicles are closely crowded together and are not arranged in groups. They are oval, pear-shaped or rounded.

Eggs elliptical in shape, yellowish-brown in color, and rounded at both ends, measuring 31.2μ by 12μ wide.

Excretory bladder U-shaped. A median stem is absent. The excretory pore lies on the ventral surface just in front of the posterior end of the body.

Host: *Rana rugulosa.*

Location: Small intestine.

Locality: Canton & Amoy.

Type Specimen: The Biological Laboratory, Lingnan University.

Discussion

Up to the present five species and two sub-species have been described for the genus *Ganeo*. They are: *Ganeo glottoides* Klein, 1905; *G. glottoides* var. *africana* Scribabin, 1914; *G. glottoides* var. *madrassensis* Mehra & Negi, 1928; *G. tigrinum* Mehra & Negi, 1928; *G. gastricus* Srivastava, 1933; *G. attenuatum* Srivastava, 1933; and *G. korkei* Bhalerao, 1936. The present species differs from *Ganeo glottoides* and its varieties in the absence of a pseudo-cirrus sac, the topography and the arrangement of the genital glands, and the size

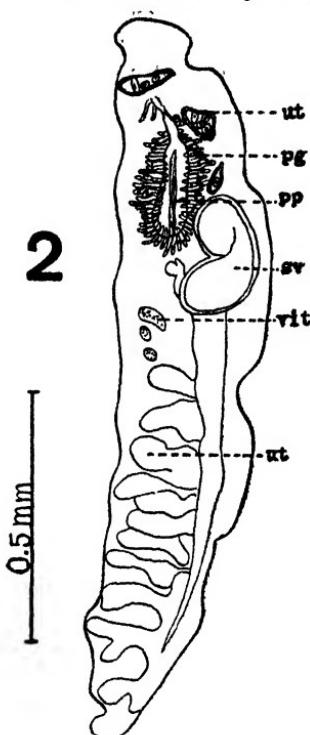


Fig. 2. A sagittal section of *Ganeo lingnanensis*.

of suckers. It appears to be most closely allied to *G. trigrinum*, but can be separated from it by the following differences: first, presence in the present species of a well developed muscular metraterm which is absent in *G. tigrinum*; second, the shape of the pars prostatica; third, the position of the anterior testis which is at some distance

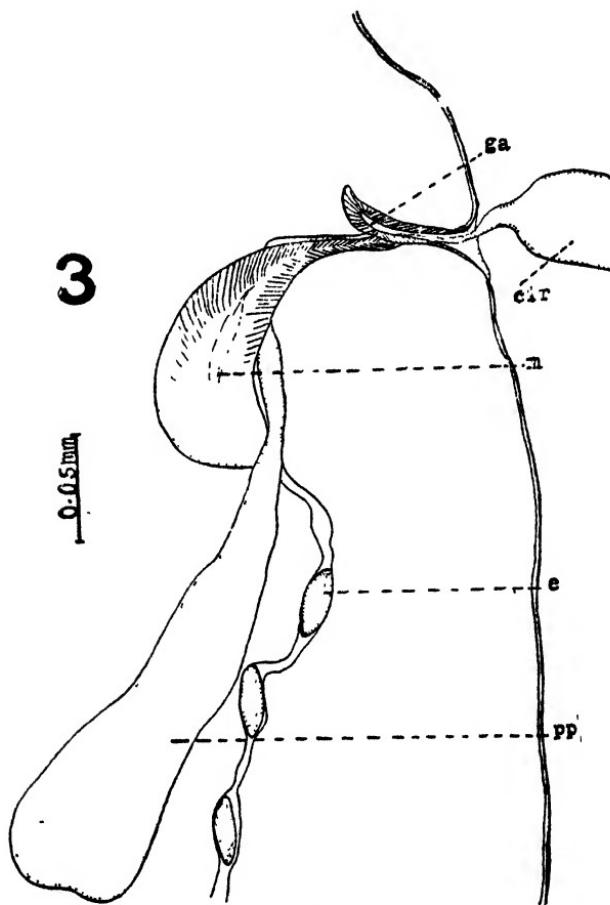


Fig. 3. *Ganeo lingnanensis* n. sp. Enlarged view of the portion near the genital pore, showing particularly the muscular metraterm and its connections.

from the fork of the intestinal caeca. The size of ova given for *G. tigrinum* was probably a mistake due to the decimal point being misplaced. Our species differs from *G. gastricus* in the presence of a well developed, muscular metraterm, the shape of ventral sucker, the position of the oral sucker as well as the position of the gonads. This species resembles *G. attenuatum* in the presence of a muscular

metraterm, but differs from it in the shape of the body, the arrangement of the uterine coils, extent of the intestinal caeca which extend further backward in *G. attenuatum*, as also in the shape of vesicular seminalis. And finally, the present species differs from *G. korkei* in the arrangement of the vitelline follicles which are not arranged in groups in the present species, the proportional sizes of testes and ovary (in our species the testes are much larger than the ovary). In view of these differences from the known species of the genus, this species has been considered as a new one for which the name *Ganeo lingnanensis* is proposed.

Key to the Species of the Genus *Ganeo* Klein, 1905

- A. Pseudo-cirrus sac present
 - B. All sex glands behind acetabulum *G. glottoides madrasensis* Mehra & Negi
 - BB. Sex glands not all behind acetabulum
 - C. The ovary and hinder testis behind acetabulum, intestines reaching posterior end of body *G. glottoides africana* Scrsabin
 - CC. Ovary alone partly behind acetabulum, intestines not reaching posterior end of body *G. glottoides* Klein
- AA. Pseudo-cirrus sac absent
 - B. Muscular metraterm absent
 - C. Vitellaria in groups of 5, body elliptical, testes smaller than ovary *Ganeo korkei* Bhalerao
 - CC. Vitellaria not in groups, body not elliptical, testes larger than ovary
 - D. Testes widely separated from each other, each partly overlapping caecum of its own side, uterus enormously developed.... *G. gastricus* Strivastava
 - DD. Testes close to each other, only the right testis does partly overlap caecum, uterus less well developed *G. tigrinum* Mehri & Negi
 - BB. Muscular metraterm present
 - C. Body attenuated, coils of uterus not numerous, intestinal caeca terminate at region far beyond vitellaria..... *G. attenuatum* Strivastava
 - CC. Body not attenuated, coils of uterus numerous, intestinal caeca terminate at region not far beyond vitellaria..... *G. lingnanensis* n. sp.

Literature

BHALERAO, G. D.

1936. Studies on the helminths of India, Trematoda III. *Jour. Helminth.* 14(4) :207-228, 5 fig.

KLEIN, W.

1905. Neue Distomien aus *Rana hexadactyla*. *Zoologische Jahrbucher Syst.* 22:59-79, 1 tafel.

LI, L. Y.

1987. Some trematode parasites of frogs with a description of *Diplodiscus sinicus* sp. nov. *Ling. Sci. Jour.* 16(1) :61-70, 7 fig.

MEHRA, H. R., AND NEGI, P. S.

1928. Trematode parasites of the Pleurogenetinae from *Rana tigrina* with a revision and synopsis of the sub-family. *Allahabad Univ. Stud.* (Allahabad) 4:66-86, *text fig. 1-3; pl. I, fig. 1 and pls. II, III, IV, VI.*

SCRJABIN, K. I.

1914. Parasitic trematodes and nematodes collected by the expedition of Prof. V. Dogiel and I. Sokolow in British East Africa. *Sci. Results. Zool. Exp. Brit. E. Afr.* 1(4):106, *pl. I, fig. 2.*

SRIVASTAVA, H. D.

1933. On new trematodes of frogs and fishes of the United Provinces, India Part II. Three new trematodes of the sub-family Pleurogenetinae from *Rana cyanophlyctis* of Oudh. *Bull. Acad. Sci. (Allahabad)* 3:103-108, *fig. 2 & 3.*

Key to Figures 2 & 3

gu.	.....	genital atrium
cir.	.....	cirrus
e.	.....	egg
m.	.....	metraterm
pg.	.....	prostate glands
pp.	.....	pars prostatæ
sv.	seminal vesicle
ut.	uterus
vit.	vitellaria

誌土蛙之一新蛭(蛭: Leechodendriidae)

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(摘要)

此篇描述土蛙之一新蛭 (*Ganeo lingnanensis*), 及刊載 *Ganeo Klein* 屬之品種檢索表。上述新蛭, 乃發見於廣州及廈門之上蛙小腸中。

**LIFE HISTORY STUDIES IN NINE FAMILIES OF KWANGTUNG
BUTTERFLIES (LEPIDOPTERA: RHOPALOCERA)¹**

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The Lepidoptera constitutes a very important group of insects because of the damage the larvae or caterpillars do to plants. Some of the species, in fact, are major pests of some of our more important plant crops. As early as 1907, Kershaw gave us notes on the host-plants and the behavior of the adults of a considerable number of Kwangtung species, many of the adults of which were illustrated in beautiful colored plates. Considering its size and the importance of the order, however, the group had been neglected. For a number of years we have collected data on this group and assembled some of the pertinent literature related thereto. The present paper places on record in a condensed form the results of our studies on 40 species of the butterflies. At a later time the moths will also be discussed. The immature forms are described so far as time and material permit. The adults are described and also illustrated, thus making it possible for the student of Lepidoptera to make use of the present paper without the necessity of having access to other literature, which for the most part is not very accessible. This paper is based upon our own work and our own specimens. For several reasons it has not been possible to attempt at this time a correlation of our results with those secured by others. In the identification of our specimens we have used to advantage the following references: Kirby "A Synonymic Catalogue of Diurnal Lepidoptera," 1871; Kershaw "Butterflies of Hong Kong," 1907; Bingham "The Fauna of British India including Ceylon and Burma," 1905-1907; Seitz "Macrolepidoptera of the World," Vol. 9, 1927. The writers are indebted to Mr. S. Y. Lau for the names of many of the host-plants.

I. DANAIDAE

1. *Euploea amymone* Godt., 1819 (pl. 7, fig. 1, 2)

This species feeds on *Morinda* sp. The full-grown caterpillars were collected on June 29, 1936, and pupated on the same day. The adult emerged on July 6.

The general color of the mature caterpillars is deep yellow with conspicuous dark brown markings. The full-grown caterpillar is 40

¹Contribution from the Lingnan Natural History Survey and Museum.

* Names arranged in alphabetical order.

mm. long, and 5.3 mm. wide. There is a large brown triangular area occupying the central part of the front of the head and a small portion of the epicranium. Two very prominent oblique bands are found on each side of the epicranium. Numerous minute hairs are present. The body bears four pairs of very conspicuous dark brown, slender, fleshy processes on the meso- and metathorax, second and eighth abdominal segments. The measurements of these four pairs are: 13, 11.5, 8 and 7 mm. long. Numerous minute hairs are also found on these fleshy processes as well as all over the body. The dorsal and subdorsal areas of the segments of the body are transversely and darkly striped. The spiracles, subspiracular areas, thoracic legs and also parts of the outside of the prolegs are dark brown.

The pupa is brilliantly silvered, with dark brown markings.

The female butterfly measures 75 mm. across the fore wings. The general color is dark brown marked with white spots. **UPPERSIDE:** The ground color is dark brown; violet reflection is present on the fore wings. The head, prothorax, and patagia are spotted. On the fore wings there are: an inconspicuous cell-dot; two conspicuous discal dots; and two submarginal rows of spots—the inner row is distinct and occupies the interspaces from 2 to 8, the outer one is indistinct and small and occupies interspaces 2 to 5. The cilia of both fore and hind wings, especially the hind wings, are dark brown alternated with white. **UNDERSIDE:** The antennae, head, thorax, abdomen, and legs are deep dark brown, while both the fore and hind wings are paler. The labial palpi, head, thorax, abdomen, and legs are spotted with white. The markings found on the fore wing are: a cell-dot, a streak in interspace 1, 3 discal dots, and 3 small preapical dots. On the hind wing are found: small dots at the base of the wing; a cell-dot; and a discal row of dots occupying interspaces 2 to 7.

2. *Euploea midamus* (Linnaeus), 1764² (pl. 7, fig. 3, 4, 5)

The caterpillars of this species feed on the leaves of *Strophanthus divaricatus* (Lour.) Hook. & Arn. Caterpillars, from 10 to 15 mm. long were found on Oct. 12, 1936; others from 18 to 25 mm. long were found on June 2, 1937. Pupation took place on Oct. 15, 1936, and July 9 to 19, 1937. Adults emerged on Oct. 26, 1936, and July 19, 1937. The duration of the pupa stage varies from 7 to 11 days; the duration of the last stadium is 6 days.

The next to the last instar caterpillars measure from 18 to 25 mm. in length and 3 mm. in width. The general color is yellow; the

² Bingham (Faun. Brit. Ind., Butterflies, Vol. 1) and Seitz (Macro-lepidoptera of the World) place this species as a synonym of *Euploea mulciber* (Cramer). Our specimens do not agree with the descriptions as given by these authors, but they do agree with the description and the figures as given for *E. midamus* (L.) by Kershaw in "Butterflies of Hong Kong."

head, four pairs of long fleshy processes with recurved tips located on the meso- and metathorax, second and eighth abdominal segments (except their basal portions which are yellow); supraanal plate, spiracles, thoracic legs, and outer portion of the prolegs, dark. The last instar caterpillars are from 26 to 30 mm. long. The general color is about the same as in the previous instar. The length of the four pairs of fleshy processes is 11, 10, 8 and 7 mm., respectively.

The pupa is smooth. It is broad with the cephalic end broadly rounded and the caudal end pointed at the cremaster, which is dark. The abdominal segments are convex dorsally. The general color is metallic-gold with brown markings; dark spiracles are present.

The male is about 68 mm. across the fore wings, while the female is about 75 mm. The general color is dark brown. The fore-wing, except the terminal margin, is suffused with metallic-blue. The markings of this species are white. **UPPERSIDE:** The head, prothorax and patagia are spotted. On the fore wing there are: a cell-dot, a discal row of 7 spots; a submarginal row of spots occupying interspaces from 1 to 7, and a terminal row of small dots which are located in interspaces from 1 to 5. The hind wing is dark brown but paler than the fore wing, and broadly paler along the costal margin; it has a submarginal row of elongate and somewhat inwardly pointed spots, and a terminal row of small spots. The cilia of both the fore and hind wings are dark brown alternated with white. **UNDERSIDE:** The antennae, head, thorax, abdomen, and legs are dark brown, nearly black. The labial palpi, head, thorax, and legs are spotted; the former is also narrowly streaked. The markings found on both fore and hind wings are: a cell-dot, a discal row of spots, an incomplete and inconspicuous submarginal row of spots, and a terminal row of spots.

II. SATYRIDAE

1. *Ergolis ariadne* (Johanssen), 1764 (pl. 7, fig. 6, 7, 8)

Ergolis ariadne (pl. 10, fig. 78), Johanssen (*Papilio*), Amoen. Acad. vi, 1764, p. 407.

The caterpillars, of various sizes, were collected on Oct. 21, 1935, on the leaves of *Ricinus communis* L. From late October to early November, the duration of the pupal stage varied from 7 to 10 days. Male specimens in our collection are as follows: Nanning, Kwangsi Province, August 2-3, 1934; Swatow, Kwangtung Province, September 7, 1934; and Canton, Honam Island, Kwangtung Province, January 9, 1935.

The general color of the mature caterpillars is dark. The mediadorsal line is yellow; the lateral areas obliquely striped with dark and ochraceous; the venter smoky. This species is characterized by the presence of scoli on the body as well as on the head. The body, except the thorax and three last abdominal segments, bears subdorsal

suprspiracular, subspiracular and subventral scoli. All of the scoli of the body are about the same in shape, the pair near the base of each proleg is slightly smaller. Abdominal segments 7 and 8 each has a medio-dorsal scolus. The last instar caterpillars are from 30 to 34 mm. long.

The pupa is slender, being 18 mm. long and 5 mm. wide—the widest part across the posterior portion of the wing. It possesses a dorsal protuberance and two small cephalic points. The caudal end is slightly pointed, flattened, and truncate at its tip. The newly formed pupa is vivid green. The lateral and dorsal lines are white. A pupa three days old is dark green with pinkish tinge.

The butterflies are from 46 to 57 mm. across the fore wings. The fore wing is truncate at apex; the outer margin angulate at inter-spaces 3 and 5, and concave between them; the anal angle slightly and obtusely angulate. The outer margin of the hind wing is conspicuously scalloped. **UPPERSIDE:** The general color is ochraceous-brown. The male is characterized by having veins 6 and 7 of the hind wing white. Brown markings are present in the cell of each wing. Sub-basal, discal, two postdiscal, one submarginal and one terminal brown wavy line, extend from the costal margin of the fore wings to vein 1 of the hind wing. The discocellular nervules of both wings are short brown lines. On the fore wing a preapical white spot is conspicuous. Cilia of both fore and hind wings are brown, generally alternated with white. **UNDERSIDE:** The general color is chestnut brown. The male is characterized by the presence of a dark brown patch extending from the base to the cell and vein 4. Dark markings are found on both fore and hind wings as follows: narrow bands in the cell, a broad band in the discal area, a still broader band in the postdiscal area. Inside the latter are dark lunules.

III. MORPHOIDAE

1. **Clerome eumeus** (Drury), 1773 (pl. 7, fig. 9, 10)

Clerome eumeus Drury (Papilio), Ill. Exot. Ent. 1, 1773, pl. 2, fig. 3.

On Feb. 11, 1935, two full-grown caterpillars were collected on *Smilax China* L. Pupation took place on Feb. 22, 1935, and the adults appeared in March.

We have specimens collected in Hong Kong Island, South China, May 26, 1935, and Hainan Island, South China, March 12, 1935.

The mature caterpillars are 52 mm. long and 7 mm. wide. The general color is pinkish with the head, spiracular and subspiracular areas, venter, and the intersegmental incisions of the abdominal segments dark. The head is characterized by the presence of a horn-like structure situated near the posterior lateral portion of each side of the epicranium. The body bears numerous long hairs.

The female butterfly is 90 mm. when the wings are spread. **UPPERSIDE:** The ground color of the fore wings is reddish-brown.

There is a conspicuous oblique preapical brownish-yellow band extending from the middle of the costal margin to the middle portion of the outer margin. The antennae, head, thorax, abdomen, and hind wings are dark brown; the latter is densely and irregularly marked with reddish-brown. **UNDERSIDE:** The general color is ochraceous-brown. The labial palpi and posterior extremity of the abdomen are yellow. The apex of the fore wing is broadly pale brownish-yellow—the inner portion of this area is dull brown. A postdiscal series of six round spots occupies the interspaces between veins 2 and 7. The color of the hind wing is uniform. There is a postdiscal row of seven spots located in the interspaces between veins 1 and 6, the size of the spots decreasing from the costal margin toward the inner margin. The spots of both wings are yellowish-white. Discal and submarginal lines are found on both wings, forming continuous lines from the costal margin of the fore wing to vein 1 of the hind wing. The subbasal line is present on the hind wing.

2. **Discophora tullia** (Cramer), 1775 or 1779¹ (pl. 8, fig. 1, 2, 3)

Discophora tullia (pl. 4, fig. 30-, Cramer (*Papilio*). Pap. Exot. 1, 1775, pl. 81, fig. A, B.

On May 15, 1936, a second last instar caterpillar was collected on bamboo. The last stadium was 12 days, and the duration of the pupal stage was 8 days. The adult appeared on June 12.

A male specimen in our collection was collected on August 5, 1926, at Canton, Honam Island, Kwangtung Province, South China.

The caterpillar is very hairy, grayish-black with yellow transverse bands and measures about 40 mm. in length. The head of the mature caterpillar is dark, nearly black. The hairs of the body are long, white, and soft. The venter is pale yellowish-white. A mature caterpillar is about 50 mm. long.

The pupa is spindle-shaped, pointed at both ends. The cephalic end is produced into two conical structures. The abdominal segments are convex dorsally. The pupa is about 24 mm. long and 8 mm. wide. It is pale with a touch of bluish-green, but the anterior end and the margin of the wing are ochraceous.

The female specimen is 75 mm. when the wings are spread. **UPPERSIDE:** The general color is dull brown. The markings are arranged in a transverse discal series which extends inward and toward the costal margin. A postdiscal and a submarginal series are present—they are rather close to each other. The hind wing possesses an inconspicuous submarginal series of ochraceous spots. **UNDERSIDE:** The basal half of the wing is light brown, beyond this there is lilacino-suffusion which is especially conspicuous near the anal angle of the hind wing. Both fore and hind wings possess short

¹ Authorities differ regarding the year.

transverse brown markings. On the hind wing there are two discal ocelli which occupy interspaces 2 and 6. These are light brown with violaceous-white centers. The male is similar to the female except in having the prominent discal secondary sex-mark. This is velvety and brown and located on the hind wing.

IV. NYMPHALIDAE

1. *Argynnis hyperbius* (Johanssen), 1764 (pl. 8, fig. 4, 5, 6)

Argynnis hyperbius (pl. 5, fig. 36), Johanssen (*Papilio*). Amoen. Acad. vi, 1764, p. 408 ♀.

Caterpillars of different sizes were collected in February and March, 1932, and November 1, 1934. The caterpillars feed on *Viola tricolor* L. From the middle of February to the end of March the last stadium requires 10 days. In the middle of November the duration of the pupal stage was 15 days, but during the period March 3 to April 9, it was about three weeks. During the latter period the last stadium was 21 days.

We have adults of this species as follows: Canton, Honam Island, March 17, 1923, and May 3, 1935; Loh Fau Shan, Kwangtung Province, South China, Oct. 13, 1935; Pi Shit Chai (near Mangtsz), Yunnan Province, South China, Aug. 18, 1934, and Sept. 6, 1934.

The third last instar caterpillar is 17 mm. long and 2.7 mm. wide; the second last instar caterpillar is 24 mm. long and 3.5 mm. wide, while the last stage caterpillars are from 34 mm. to 50 mm. long and 5 mm. wide. The general color of the mature caterpillar is dark, the scoli of the abdominal segments are somewhat pink with black at their tips. The medio-dorsal line is conspicuous orangetawny, and the prolegs are pale orange. On the prothorax there is one scolus on each side of the body, but on the mesothorax and metathorax there are two rows of scoli found on each side of the body. On the first eight abdominal segments there are three rows of scoli occupying the subdorsal, lateral, and subspiracular areas. On the ninth abdominal segment there are only two conspicuous scoli located on each side of the body.

The brownish pupa (22 mm. long and 7 mm. wide) is subangular and spinous; it possesses two cephalic points; it is gradually pointed toward the posterior extremity. On the dorsum there is a mediodorsal thoracic protuberance and two rows of spines, the anterior five pairs of which are metallic silvery-gold, bent-over, and keeled while the posterior six pairs have the tips dark and pointed. Two rows of spines are found on the dorsum.

The wing expanse of the male butterfly is 66 mm. The antennae are dark brown with their apices orange. The head, thorax, and abdomen are orange-yellow with the thorax and abdomen suffused with dark olivaceous-brown, while their undersides are lighter in color. The ground color of the wings is orange-yellow, the hind

wings somewhat paler. The dark markings found on the fore wings are: a basal somewhat transverse streak; a broad oval loop of which the outer margin is sinuous; a broad transverse streak which is pointed toward the median nervule; the discocellular defined by a broad band; a curved discal series of larger spots occupying interspaces 1 to 6; three spots inside of the discal series located in the first three interspaces, the first one being smaller; an incomplete postdiscal series of spots composed of five (the first two being smaller and occupying interspaces 1 and 4, the third one in interspace 5, the fourth and fifth in interspace 6, the one inside of the other); an inner complete series of submarginal spots located in interspaces 1 to 8; an outer submarginal line being wider on the veins; and a terminal very slender line. The dark markings found on the hind wings are: an inconspicuous basal spot; a conspicuous big spot found in interspace 7; a distinct transverse lunule located in the middle of the cell; a lunule at the lower discocellular; a discal series of spots found in interspaces 1 to 7; a postdiscal series of spots occupying interspaces 2 to 6; a submarginal row of lunular spots in interspaces 1 to 7; and a terminal band which is transversed posteriorly by a row of blue slender markings, and anteriorly by a series of slender ochraceous lunules. **UNDERSIDE:** the fore wing is pale earthy-red shaded with ochraceous toward the apex. Olivaceous-brown markings occur on the ochraceous apical area. The hind wings are variegated with ochraceous, olivaceous-brown, silvery-white, and dark, nearly black, markings. The female butterfly is 68 mm. when the wings are spread. **UPPERSIDE:** It differs from the male in that the apical half of the fore wing is dark. The dark area extends from about the middle of the costal margin obliquely to or nearly to the anal angle. A very broad white band (which is also visible on the underside) extends from the costal margin to the submarginal series of black spots; several white spots are found on the apical area.

2. **Atella phalantha** (Drury), 1770 or 1773 (pl. 8, fig. 7, 8)

Atella phalantha Drury. (*Papilio*), Ill. Exot. Ent. 1, 1770, pl. 21, fig. 1, 2.

Caterpillars of various sizes were collected on *Xylosma racemosus* (S. & Z.) Miquel (*X. congestum* (Lour.) Merr.) on Oct. 29, 1935. From late October to early November the duration of the pupal stage is 8 days. Adults appeared on Nov. 11, 1935.

Specimens in our collection: Sam-ah-kong, Hainan Island, South China, Jan. 24-26, and Feb. 1 and 6, 1935; Canton, Honam Island, Kwangtung Province, Aug. 29, 1923.

The mature caterpillars are about 40 mm. long. The general color of the mature caterpillar is smoky-brown. But the color may vary from dark brown to pale yellowish-white. The body bears six rows of scoli. The subdorsal and supraspiracular scoli are pale-ochraceous with their bases brown and marked with dark ring-like structures. The subspiracular scoli are pale with their bases brown.

The lateral line is yellowish-white; the thoracic legs ochraceous. The venter and also the prolegs are greenish-yellow. The cephalic and latero-cephalic aspects of the head are brown. The spiracles are dark, nearly black.

The pupae are sub-angular, beautiful green, and from 16 to 19 mm. long and 6 to 7 mm. wide. On the dorsum there is a row of conspicuous tubercles which are creamy white at their bases; the cephalic portions of the tubercles are metallic-scarlet, with the tips of those found on the anterior 3 pairs and also those found on abdominal segments, 3, 5, 7 and 8 dark, nearly black. The costal margin and part of the outer margin of the wing are bordered largely by metallic silver, scarlet, and black. On each side of the head, a black spot with metallic scarlet center is present. Several conspicuous dark markings are also present on the posterior end of the pupa.

The butterflies measure from 45 mm. to 55 mm. across the fore wings. The general color is orange-yellow, with dark, nearly black markings. *UPPERSIDE*: the markings found on the *Fore Wing* are: three or four (depending upon whether fused or not) irregular transverse markings; a broad irregular band along the discocellulars; a row of spots below the median nervule and interspace 4, forming a somewhat oblique line; a discal row of spots which runs progressively outward from interspace 1 to the costal margin; a postdiscal series of spots in interspaces 1 to 5, with the first one being the farthest outward; an inner submarginal sinuous line extending from interspace to the costal margin; an outer submarginal slender line; a terminal series of triangular spots with their apices touching the outer submarginal line. *Hind Wing*: on the basal half there are three or four transverse rows of inconspicuous spots; a discal series of 4 spots occupying interspaces 2, 3, 5, and 6, an inner submarginal sinuous line; an outer submarginal sinuous line; a terminal series of spots, wider at the vein and touching the outer submarginal line. *UNDERSIDE*: the general color is ochraceous with violet and black, the markings orange-yellow. The labial palpi, head, thorax, and abdomen are white.

3. *Cupha erymanthis* (Drury), 1770 or 1773 (pl. 8, fig. 9, 10)

Cupha erymanthis Drury, (*Papilio*), Ill. Ex. Ent. i, 1770, pl. 15, figs. 3, 4, ♀.

On Nov. 18, 1935, two caterpillars were collected on *Xylosma recemosus* (S. & Z.) Miquel. The pupal stage required 15 days during the latter part of November and early part of December. Adults emerged on Dec. 11.

The mature caterpillar is about 40 mm. long. The general color of a caterpillar 24 mm. long is grayish-brown with six rows of smoky-black scoli. As viewed cephalically, the head is ochraceous with two large black spots, one on each side of the epieranium. Time

did not permit drawing up a description of a living specimen of the last instar at the time the species was reared.

The pupa, 18 mm. long and 5 mm. wide, is apple-green with metallic silvery markings. Scarlet markings appear on the silvery areas especially on the margins of the developing wings. There are eight slender reddish filaments with the portion near their apices dark. In addition there is a pair of cephalic projections, and a pair of subdorsal tubercles which are found on the mesothorax. Several pairs of dark tubercles are also found at the posterior end.

The butterfly is 51 mm. across the fore wings. The general color is ochraceous light brown with the head, thorax, and abdomen darker. The head and thorax possess dark green hairs. UPPERSIDE: Black markings are present. The *Fore Wing* possesses: an indistinct transverse cellular marking; an inconspicuous, broad, transverse irregular band at discocellulars; a discal irregular band from vein 1 to the costal margin (becoming broader and extending outward in interspaces 3 and 4, and the margin indented outward in interspace 1 and inward in interspace 2); a postdiscal series composed of three spots occupying interspaces 1 to 3, the one in interspace 1 being the largest. The apical area is black and extends posteriorly into a terminal band which reaches the anal angle. There is a light yellowish-brown submarginal wavy line, anteriorly touching the apical area, posteriorly reaching vein 2, and outwardly in contact with the terminal band. The *Hind Wing* possesses: on the basal half an inconspicuous transverse slender marking followed by a somewhat wavy line; a transverse row of five spots occupying interspaces 2 to 6; a curved postdiscal series of broad lunules in interspaces 1 to 7; a submarginal sinuous line and a terminal line occupying the outer margin. UNDERSIDE: The general color of the butterfly is light ochraceous with inconspicuous dark markings. The discal line of the hind wing is purplish and zigzag.

4. *Junonia hirta* (Fabricius), 1798 (pl. 9, fig. 1, 2, 3)

Junonia hirta (pl. 6, fig. 41), Fabricius, (*Papilio*), Ent. Syst. Suppl. 1798, pl. 424.

The caterpillars feeding on leaves of *Barleria cristata* L., were collected during October to the first three weeks of November 1936; and in April and May, 1937. Pupation took place from October 20 to November 20 and during the first week of May. Adults emerged in November, the first week of December and the last twenty days of May. In October and November the third last stadium was 7 days, next to the last stadium 9 days on the average; the last stadium 9 days (average). The average duration of the pupal stage was 8 days. During the months of November and December the duration of the pupal stage varied from two to three weeks.

We have a male butterfly which was collected at Sam-ah Kong, Hainan Island, Jan. 30, 1935.

This species probably has five instars; the length of the second instar caterpillar varies from 24 mm. to 47 mm. The last instar specimen is 34 mm. long and 5.5 mm. wide. The young caterpillars, about 12 mm. long, are very dark, and have bluish-black scoli. The neck (anterior portion of the prothorax) is yellow. The ground color of the mature caterpillars is very dark but the scoli are bluish-black. The bases of the scoli found on the lateral areas are yellowish-orange. The bases of the medio-dorsal scoli found on the abdomen are yellowish-orange. Minute white spots appear on the medio-dorsal line. The neck is yellow in color.

The pupa, 18 mm. long and 6.5 mm. wide, is variegated with both dark and light dull brown. The cephalic end is broadly rounded; the thorax convex dorsally; the cremaster ventrally curved. Tubercles on the dorsum of the abdomen are as follows: a medio-dorsal row; a subdorsal row; a row dorsad of the abdominal spiracles; and a subspiracular row which is not very noticeable.

The male butterfly is 45 mm. to 53 mm. across the fore wings, the female is 54 mm. Male: UPPERSIDE: The ground color is yellow. *Fore Wing*: the apex, the outer margin, and the inner margin (a projection extending upward and in continuation with the anal angle), are black; this black border narrows near the middle of the outer margin. In the apical black area there are an inverted v-shaped spot and a submarginal series of yellow spots somewhat shaded. In short, the fore wing is yellow in the center and bordered with black. *Hind Wing*: the anterior half and the outer margin are black, the costal margin broadly paler; the inner margin largely shaded with grayish-brown; anterior central spot with metallic blue center. The thorax and abdomen are black, while the head and antennae are somewhat grayish-brown, with eyes reddish-brown. The cilia of both fore and hind wings are white and alternated with dark grayish-brown. UNDERSIDE: the ground color of the *Fore Wing* is pale yellow, with grayish-yellow shading and jet-black and orange-yellow markings. *Hind Wing*: the ground color is grayish-yellow; light and dark grayish wavy markings are present. The head, thorax, and abdomen are pale grayish-white. Female: UPPERSIDE: *Fore Wing*: differs from the male by having a more or less complete transverse marking in the cell, and another at the discocellulars; two black ocelli with lilacinous blue centers located in interspaces 2 and 5; a submarginal zigzag light yellow line. *Hind Wing*: the anterior central spot comparatively smaller and with slight violet tinge; two small ocelli with ill-defined lilacinous blue centers located in interspaces 2 and 5; a submarginal sinuous light orange-yellow band. UNDERSIDE: the markings are darker.

5. ***Junonia orithya* (Linnaeus), 1758 (pl. 9, fig. 4, 5)**

Junonia orithya Linn. (*Papilio*), Syst. Nat. ed. x, 1758, p. 473.

On Nov. 1, 1934, a second last instar caterpillar was collected on an unknown plant known locally as Heung Ma Shue (香麻樹). The

last stadium requires about 15 days and the duration of the pupal stage is about a month. The adult emerged on Dec. 22.

LOCALITIES: Lung-Tau Shan, Sept. 25, 1923; Swatow, Ch'eng-hai District, Sept. 7, 1934; Canton, Honam Island, Oct. 21, 1935; Sam-ah Kong, Hainan Island, Feb. 1, 1935.

The female is 50 mm. across the fore wings. UPPIERSIDE: the antennae are pale ochraceous with darker tips; the head and prothorax reddish-brown; mesothorax, metathorax, and abdomen are brownish-black. *Fore Wing*: largely black, with the apical area smoky-brown. A conspicuous creamy white band extends from interspace 3 to 6; a submarginal band occupies interspaces 2 to 9, and is intercepted by an ocellus in interspace 5 which is orange-yellow with a black and violet center. A large ocellus in interspace 2, which is black with a violet center and surrounded by an orange ring. Two obscure orange-colored markings are found in the cell. A metallic blue patch occupies the area near the anal angle. Finally, there is a light smoky-brown terminal band. Most of the costal margin is creamy white. *Hind Wing*: largely metallic blue, with a jet black area toward the base. There is a postdiscal ocellus located around veins 2 and 3. The center of this ocellus is approximately half violet and half black, surrounded by an orange ring and this in turn by a black ring. A similar larger postdiscal spot in which the center is largely violet is located around veins 5 and 6. UNDERSIDE: the ground color is grayish-brown. Orange markings, black markings, a dark centered ocellus, and brown shading characterize the fore wings. The hind wing is grayish-brown with a broad brown postdiscal band with its inner margin sinuous. The labial palpi, thorax, and abdomen are pale. The male differs from the female by having the ocelli, especially on the hind wing, smaller—the anterior ocellus actually reduced to a mere spot.

6. *Neptis eurynome* (Westwood), 1842 (pl. 9, fig. 6, 7)

Neptis eurynome (pl. 9, fig. 64), Westwood (*Liminitis*), Donovan's Ins. China, 2nd ed. 1842, p. 66, pl. 35, fig. 4.

On July 6, 1937, one young caterpillar, feeding on *Desmodium triquetrum* DC., was collected. The next to the last stadium requires 5 days, the last stadium 7 days, and the pupal stage 7 days. The adult emerged on July 26.

These butterflies were collected in Siu Lam, Kwangtung Province, Sept. 18 and 20, 1923; Tongking, French Indo-China, August 12 to 13, 1934.

The male butterfly is 50 mm. across the fore wings. UPPIERSIDE: The general color is smoky-black with pure white markings. *Fore Wing*: the markings are: clavate streak in the cell with quadrate apex and indistinctly divided subapically; beyond the cell-streak a triangular spot acute at apex; a curved discal series of separate spots occupying interspaces 1a, 1, 2, 3, 5, and 6; a somewhat broken

postdiscal lunular line; and an incomplete submarginal series of markings. *Hind Wing*: broadly pale along the costal margin; a subbasal band of nearly uniform width extends from costa to inner margin; obscure discal submarginal pale line; a postdiscal series of spots, the spots being quadrate and separate, and occupying interspaces 1a to 6. The cilia of both wings are white alternated with smoky-black especially on the hind wing. *UNDERSIDE*: The ground color light chocolate or reddish-brown; white markings bordered by dark line similar to those on upperside; discal and submarginal lines more prominent. The head, thorax, and abdomen are white with two chocolate-colored bands on each side of the thorax.

7. *Pantoporia opalina* (Kollar) ?, 1844 or 1848 (pl. 9, fig. 8, 9)

The young caterpillars were found on what may be *Mussaenda frondosa* on Oct. 20 and Dec. 10, 1936. In the months of Oct. and Nov., the last stadium requires 8 days and the pupal stage 12 days, while in the months of Dec., Jan., Feb., and March, the next to the last stadium requires 20 days, the last stadium 34 days, and the pupal stage 28 days.

The first instar caterpillar is about 5.5 mm. long and 0.645 mm. wide; the second instar about 5 to 7 mm. long; the third instar 7 to 10 mm.; the fourth instar 10 to 16 mm.; and the last instar 16 to 34 mm. The general color of the young caterpillars is largely brown, with the head and scoli reddish-brown, later changing to somewhat greenish. Shortly before pupation the ground color of the mature caterpillar is light creamy-brown, except the head which is still reddish-brown and the tips of the scoli which are pale brown. The structure of this species is much like the following species, *P. perius*, from which it differs as follows: in having a dark brown blotch (darker on young caterpillars) on top of the 4th abdominal segment; in having some of the crochets at each end of the series longer and larger; in having the spinous projections of the scoli less strongly produced.

The pupa resembles that of *P. perius* in color and shape but is smaller (15 mm. long and 6 mm. wide).

The butterflies measure from 48 to 53 mm. across the fore wings. **UPPERSIDE**: Male and female: General color brownish-black with the following creamy white markings: a narrow trifid cell-streak followed by a slender triangular spot; a much curved discal series of seven spots, the one located in interspace 4 being subtriangular and small, while those found in interspaces 5 and 6 subtriangular and large, a transverse postdiscal series of indefinite spots; and an inconspicuous submarginal light brown line. *Hind Wing*: a transverse discal band extends from veins 1 to 7; a somewhat curved postdiscal band; and a submarginal light brown line. The cilia are brownish-black alternated with white, especially on the hind wing. The antennae, head, thorax and abdomen are also dark brownish-

black with the apices of the antennae and the eyes reddish-brown. A transverse row of bluish-white markings is found on the base of the abdomen. **UNDERSIDE:** The ground color of both wings is chocolate brown with shining lilacinous, especially the inner margin of the hind wing. The markings are about the same as those on the upperside. The area below the cell and to vein 4 or 5 of the fore wing is darker. The labial palpi and abdomen are largely whitish, while the thorax is iridescent bluish-white.

8. **Pantoporia perius** (Linnaeus), 1758 (pl. 9, fig. 10; pl. 10, fig. 1)

Athyma perius Linn. (*Papilio*), Syst. Nat. x, 1758, p. 471.

Eggs of this species were collected on Feb. 18 and 23 and April 17 and 20, 1937. The caterpillars were collected in Jan., May, Nov. and Dec. The food plants are *Glochidion eriocarpum* Champ. and *G. macrophyllum* Benth. In the months of Feb., March and April, this species requires from 49 to 62 days to complete its life cycle, but in April and May, it needs from 23 to 27 days. There are five instars. The first stadium of the early spring generation varies from 4 to 6 days, the second stadium from 5 to 7; the third stadium 4 to 7 days, the fourth stadium from 4 to 7; and the last stadium from 9 to 18 days. The duration of the pupal stage varies from 12 to 21 days. From about April 20 to about the middle of May, the first stadium requires 3 or 4 days, the second stadium 2 days, the third stadium 2 to 4 days, the fourth stadium 2 to 3 days, and the last stadium 6 or 7 days. The duration of the pupal stage varies from 6 to 9 days. Adults emerged during the last ten days of January, the first ten days of March, the first twenty days of April, about the middle of May, and during the last two weeks of December.

Adults in the collection are as follows: Lung Tau Shan, Sept. 24, 1923; Swatow, Sept. 7, 1934; White Cloud Mt., Canton, Jan. 9, 1935; Ham-po-ts'uen, Hainan Island, Sept. 1-3, 1935.

The eggs are rounded in outline and flattened where attached to the leaves. They are usually laid near the edge of the leaves. The egg is 1.12 mm. in one diameter and 1.20 mm. in the other, and 0.989 mm. in height. The general color is yellowish. The egg appears to be composed of numerous hexagons, the center of each of which is concave. Short woolly white hairs are found on the margins of the hexagons.

The first instar caterpillars are from 2.75 to 5.37 mm. long, on the average. The general color is brown. A newly hatched caterpillar is "big headed". Short hairs are found on the head as well as on the body. The body bears several rows of tubercles.

The second instar caterpillars are from 5.37 to 6.37 mm. long. The general color is dark brown. The tubercles of the head, and scoli of the body are distinguishable. The head is wider than the body.

The third instar caterpillars are from 6.37 to 9.87 mm. long. The general color is the same as in the previous instar. The tubercles of the head and scoli of the body are more prominent. The head is still wider than the body.

The fourth instar caterpillars are from 9.87 to 14.2 mm. long. The general color is brown; the tubercles of the head more conspicuous. The scoli of the body are stout and possess comparatively larger spinous projections. The head is about the same width as the thorax.

The last instar caterpillars vary from 14.2 to 31 mm. in length. The ground color of young last instar caterpillars is largely green; the scoli pale brown. The mature caterpillars are vividly green; the bases of the scoli are dark green with the apical spinous projections dark. The head and the thoracic legs are also dark. The head is characterized by the presence of conspicuous tubercles found all over the epicranium. Numerous big punctures are found on each side of the epicranium, and also on certain parts of the head when viewed cephalically. The body bears six rows of scoli. The scoli of the prothorax are wanting. The scolus possesses several strong spinous projections, especially at its tip. Subdorsal scoli are found from the mesothorax to last abdominal segment. Supraspiricular scoli are located from the first to the eighth abdominal segments. The size of the scoli decreases from the subdorsal ones to the subspiracular ones. Most of the scoli of the subdorsal areas are at least twice as large as those of the subspiracular ones.

The pupa is about 23 mm. long and 7.5 mm. wide. The general color is brown with metallic silver markings which are found largely on the subdorsal areas. As viewed from above, there is a pair of laterocephalic conspicuous projections. The posterior extremity is flattened and gradually pointed. The caudal portion of the mesothorax is slightly elevated and posteriorly produced; at the base of the abdomen (about the second segment) the pupa is conspicuously and dorsally elevated. A light constriction can be seen on the wings between the abdomen and thorax. Rows of tubercles are found on the medio-dorsal and subdorsal areas. Minute hairs are found on the body especially on the abdominal segments. The wing resembles a leaf.

The adults are from 47 to 60 mm. across the fore wings. **UPPERSIDE:** Male and female: *Fore Wing*: brownish-black with creamy white markings as follows: a clavate trifid cell-streak followed by a somewhat conical structure; a curved discal series of spots in interspaces 1a to 6, the first three broad and subrectangular, 3 and 4 smaller, 5 and 6 rather elongated and bent obliquely inward; a transverse postdiscal series of small spots from interspaces 1 to 6; and an indistinct transverse terminal broken wavy line. *Hind Wing*: a subbasal band extends from veins 1 to 7 forming a con-

spicuous and continuous band with the discal band of the fore wing. There is a postdiscal row of spots inwardly marginated by a series of round black dots; and a terminal row of inconspicuous lunules. The cilia of both wings are creamy white alternated with brownish-black. The ground color of antennae, head, thorax and abdomen is brownish-black. The vertex of the head and prothorax are light golden brown. A row of transverse creamy white spots occurs on the mesothorax and patagia. Two spots appear on the scutellum of the mesothorax. The abdominal segments are banded with white, the first band being iridescent bluish-white and more prominent.

UNDERSIDE: The general color of both wings is golden ochraceous-yellow. The markings are about the same as on the upperside, except they are marginated and defined with black, and interspace 1a and most of interspace 1 of the fore wing are smoky-black. The postdiscal band of the hind wing is bordered inwardly with pale blue which includes also the veins. There is a superimposed row of black spots on the postdiscal band. Both the fore and hind wings possess subterminal bluish-white wavy lines and terminal black wavy lines. The labial palpi, thorax, and abdomen are whitish. There is a row of small black spots on each side of most of the abdominal segments.

9. **Pantoporia selenophora** (Kollar), 1844 or 1848 (pl. 10, fig. 2, 3)

Pantoporia selenophora Kollar (*Lamunitis*), Hugo's Kaschnir, IV, pt. 2, 1844, p. 426, pl. 7, fig. 1, 2, ♂.

Small caterpillars, from 5 to 8 mm. long were collected during the first week of Nov. and the first ten days of Dec. on what was thought to be *Mussaenda frondosa*. The second last stadium of the winter generation varies from 16 to 22 days, the last stadium requires from 16 to 30 days, and the pupal stage takes from 22 to 32 days. Adults emerged during the second half of February and the first week of March.

An adult was collected at Loh Kong Tung, Kwangtung Province, Dec. 17, 1932.

The young caterpillars are brownish, later changing to green. The third instar caterpillars are from 5 to 10 mm. long, the fourth instar caterpillars 10 to 15 mm., the last instar caterpillars 15 to 27 mm. long. A last instar caterpillar, a few days old, may be described as follows: the ground color of the body green, with head and spines dark brown. The head bears numerous reddish-brown tubercles. There are four very large scoli on the dorsal and subdorsal areas of the mesothorax, and two on the metathorax. The body segments bear six rows of scoli, with the dorsal pair much larger. The thoracic legs are amber colored, blackish toward the base. The prolegs are pinkish, shining. The subventral area of the first and second abdominal segments is whitish. On the dorsum of the fourth abdominal segment there is a large very dark red spot.

The butterfly is 41 mm. across the fore wings. **UPPERSIDE:** Male: The ground color is dark brownish-black. *Fore Wing*: a somewhat trifid dark red streak in the cell, followed by three subtriangular and elongate whitish spots; a very prominent white band from inner margin to interspace 3, and which has a narrow margin of iridescent bluish-lilacinous; a transverse. Obscure submarginal series of lunular spots; a terminal indistinct pale line. *Hind Wing*: a broad prominent white discal band from vein 1 to 7 forming a continuous line with the discal band of the fore wing; a postdiscal row of pale spots between veins 1 and 7; and a pale submarginal line. The cilia of both wings are dark brownish-black alternated with white especially on the hind wings. The antennae, head, thorax, and abdomen are dark brownish-black. The eyes are dark brown. **UNDERSIDE:** The ground color of both wings is bright chocolate brown; white markings same as those on upperside. On the fore wing a dark postdiscal blotch is found in interspace 1a, 1, 2, and 3. The inner margin of the hind wing is broadly iridescent bluish-lilacinous, as are the labial palpi and thorax. The abdomen is dusty white, tinged with pale blue.

10. ***Vanessa canace* (Johanssen), 1763 (pl. 10, fig. 4, 5)**

Vanessa canace Johanssen (*Papilio*), Centur. Ins. 1763, p. 23.

Small caterpillars were collected during the last ten days of November, medium-sized caterpillars were taken during the first two weeks of January and both small and medium-sized caterpillars were collected from May 20 to the beginning of June. Pupation took place during the first two weeks of February, the first ten days of June, and the last twenty days of December. Adults emerged at the end of January, in February, the first week of March, and about the middle of June. The caterpillars fed on *Smilax China* L. In short, from November to February three months are required to complete the life cycle. During this period the pupal stages require about a month. In June the pupal stage takes only six days.

Adults were collected at Canton, Honam Island, May 3, 1935, and at Loh Kong Tung, Dec. 17, 1935.

The eggs are greenish and have about 10 white stripes. The newly hatched caterpillar is grayish with the head black. It is about 2.5 mm. long; the body bears simple hairs. The ground color of young caterpillars about 8 mm. long is yellowish with the head dark. Later (when about 20 mm. long) it changes to dark color with white transverse markings. Each segment is narrowly transversely banded with dark and pale yellow. The yellow bands are narrower than the dark ones. Each segment is also transversely and broadly banded with orange which is darkly spotted where the scoli are found. The scoli are somewhat pale yellow; the spinous projections of the scoli are dark at their tips. The mediodorsal scoli are situated from the first to the eighth abdominal

segments. The subdorsal scoli are present on all segments except the prothorax. The supraspiracular scoli are found from the mesothorax to the eighth abdominal segment, inclusive. The subspiracular scoli are found on the first eight abdominal segments. The head is largely dark brown, almost black. The thoracic legs and supraanal plate are dark. The prolegs are also dark but ringed at the bases with orange. The venter is nearly black, but with whitish markings as on the upper surface.

The general color of the pupa is deep purplish-brown and marked with reddish and dark. The pupa is about 31.5 mm. long and 8.5 mm. wide. It is somewhat angular. The head is cephalically produced and bifid, with the tips curved ventrad. The medio-dorsal portion of the mesothorax elevated. A constriction appears on the later portion of the wings, near the metathorax and the first abdominal segment. The posterior extremity is strongly produced and slightly pointed at tip, apparently fused by two conical structures. The pupa bears seven rows of tubercles which are found on the medio-dorsal, subdorsal, supraspiracular, and subspiracular regions with those found on the subdorsal areas more conspicuous. Two pairs of silver spots are found on the subdorsal area of the metathorax and first abdominal segment.

The butterflies are 52 to 58 mm. across the fore wings. **UPPER-SIDE:** Male and female: The general color is black, with indigo-blue tinge. The blue bands found on the wings are as follows: a postdiscal slightly wavy band from the costa of the fore wing to vein 1 of the hind wing; on the fore wing, a white preapical spot followed by a curved blue band which reaches to the above-mentioned postdiscal band. A series of black small spots is found in the postdiscal band of the hind wing from interspaces 2 to 6. The blue obscure submarginal and terminal broken lines are found on both wings. The antennae are dark, nearly black, with their apices reddish-brown; eyes reddish-brown. The head, abdomen, and thorax of the same color as the wings, while the thorax is densely covered with iridescent greenish-brown hairs. **UNDERSIDE:** The basal half of the wing and a broad terminal margin are very dark brown, but the ground color is dull ochraceous-brown. The wings are thickly and almost entirely covered with slender transverse dark brown striae. The labial palpi, thorax, and abdomen are very dark brown, sparsely mixed with bluish-white hairs.

V. NEMORIIDAE

1. *Abisara echerius* (Stoll), 1790 (pl. 10, fig. 6, 7)

Abisara echerius Stoll. (*Papilio*), Cramer, Pap. Exot. v. 1790, pl. 31, fig. 1, 1a, 1b.

On June 2, 1937, 4 spherical and greenish eggs were collected on the underside, near the edge, of a leaf of *Actinodaphne chinensis* (Bl.) Nees. The eggs hatched in June, and the newly hatched caterpillars

were about 3 mm. long. The first stadium requires five days, the second stadium 2 days, and the last stadium 4 days. The duration of the pupal stage is 8 days. Adults emerged on June 28.

In the collection we have a butterfly which was collected at Canton, Honam Island, August 15, 1923.

The head of the caterpillar is light pale yellow with body pale, bearing whitish hairs. The first instar caterpillar is from 3 to 6.5 mm. long, the second instar caterpillar from 6.5 to 9.5 mm., the last instar caterpillar from 9.5 to 18 mm. The general color of the last instar caterpillar is green with the medio-dorsal line deeper green. Very small whitish spots are found on the body. The hairs observed on the body are arranged in groups of three, distributed in three rows on the lateral area, but the hairs found on the latero-ventral areas are pale.

The greenish pupa is 15 mm. in length, 6.5 mm. in greatest width, and 4.5 mm. in greatest thickness. The cephalic end of the pupa is cleft, its posterior end pointed. Fairly long distinct hairs are found on the lateral margins, and minute hairs found all over the body. On the anterior part of the pupa, there are two pairs of subdorsal dark eye-spot structures. Caudad of the second pair of black spots there is a girth, which with the aid of the posterior extremity, fastens the pupa to its support.

The wing expanse of the butterflies is 30 to 32 mm. The general color is maroon brown. UPPERSIDE: Male: *Fore Wing*: a discal fascia, a postdiscal fascia and submarginal obscure transverse lines are found. *Hind Wing*: there is a pale discal fascia and also a postdiscal band. In the latter there are three dark spots in inter-spaces 1, 5, and 6. The antennae are dark brown ringed with creamy white. The eyes are reddish-brown. The head, thorax, and abdomen are brown. UNDERSIDE: The ground color of both wings is lighter than that of the upperside, but the markings are much more conspicuous. The postdiscal band of the hind wing appears to be composed of maroon brown and dark spots which are marginated with whitish. The submarginal pale line is present. The labial palpi, thorax, abdomen and legs are pale ochraceous.

2. *Zemeros flegyas* (Cramer) ?, 1780 (pl. 10, fig. 8, 9, 10)

From the last two weeks of November to the first week of December, the full-grown caterpillars of this species were collected on *Maesa sinensis* A. DC. From the end of November to the first ten days of December, the duration of the pupal stage was 15 days. Adults emerged in the months of December, January and the first week of February.

Butterflies were collected as follows: at Lung Tau Shan, Sept. 20 and 29, 1933; Loh Fau Shan, July 23, 1935; Sam-ah-kong, Hainan Island, Feb. 6, 1935.

The mature caterpillars are from 19 to 20 mm. long, and 8 mm. wide. The general color is pale green; the median line, which is marginated with dark green lines, possesses reddish markings. The body is strongly dorso-ventrally compressed. The abdomen is wide and tapers toward the anterior end. The segments are laterally produced between the transverse conjunctivae, so that the lateral margins are conspicuously crenulate. At the posterior end the posterior lobe and two lateral lobes form a tri-lobed structure. The latero-cephalic portion of the prothorax is produced—bearing rather long hairs which possess short spinous projections. These hairs are found all over the lateral margins of the thorax as well as on the abdominal segments. The body also bears numerous minute hairs.

The smooth greenish pupa is 18.5 mm. long and 6 mm. wide. The pupa is generally fusiform. The anterior end is truncate rounded, with a notch at its center. The pupa is dorso-ventrally compressed; the abdominal segments distinctly marked; and the posterior end is gradually tapered and nearly pointed at its tip.

The male butterflies have a wing expanse of 27 to 31 mm.; females 33 to 35 mm. **UPPERSIDE:** Male: the adults, which emerged in December, January, and February, may be described as follows: ground color dark brown; markings pale brownish-ochraceous, most of the spots marginated inwardly by an indistinct elongated black spot. There are roughly four rows of spots, which are found on the subbasal, discal, postdiscal, and submarginal areas. The postdiscal series is partly obscure—the spots in interspaces 3, 5, 6 and 8 are distinct. The antennae, head, thorax, and abdomen dark brown, with the antennae ringed with white; the eyes are darker. The cilia of fore wings are dark brown alternated with light brown ochraceous. **UNDERSIDE:** The ground color is light chocolate brown. The markings are similar to those on the upperside except more clearly defined, lighter in color, and conspicuous, especially the postdiscal spots in interspaces 5, 6, and 8. The labial palpi and legs are light chocolate brown, while the thorax and abdomen are lighter. The females are similar to the male except of lighter shade and brighter, the markings more prominent.

Explanation of Plates

Plate 7

- Fig. 1. *Euploea amyntome* Godt., 1819, dorsal side ♀.
2. *E. amyntome* Godt., 1819, ventral side ♀.
3. *E. midamus* Linn., 1764, dorsal side ♂.
4. *E. midamus* Linn., 1764, ventral side ♂.
5. *E. midamus* Linn., 1764, dorsal side ♀.
6. *Ergolis ariadne* (Joh.), 1764, dorsal side ♂.
7. *E. ariadne* (Joh.), 1764, ventral side ♂.
8. *E. ariadne* (Joh.), 1764, dorsal side ♀.
9. *Clerome eumeus* (Drury), 1773, dorsal side ♀.
10. *C. eumeus* (Drury), 1773, ventral side ♀.

Plate 8

- Fig. 1. *Discophora tullia* (Cramer), 1775 or 1779, dorsal side ♂.
 2. *D. tullia*, (Cramer), 1775 or 1779, dorsal side ♀.
 3. *D. tullia* (Cramer), 1775 or 1779, ventral side ♀.
 4. *Argynnis hyperbius* (Joh.), 1764, dorsal side ♂.
 5. *A. hyperbius* (Joh.), 1764, ventral side ♂.
 6. *A. hyperbius* (Joh.), 1764, dorsal side ♀.
 7. *Atella phalantha* (Drury), 1770 or 1773, dorsal side ♀.
 8. *A. phalantha* (Drury), 1770 or 1773, ventral side ♀.
 9. *Cupha erymanthis* (Drury), 1770 or 1773, dorsal side ♂.
 10. *C. erymanthis* (Drury), 1770 or 1773, ventral side ♂.

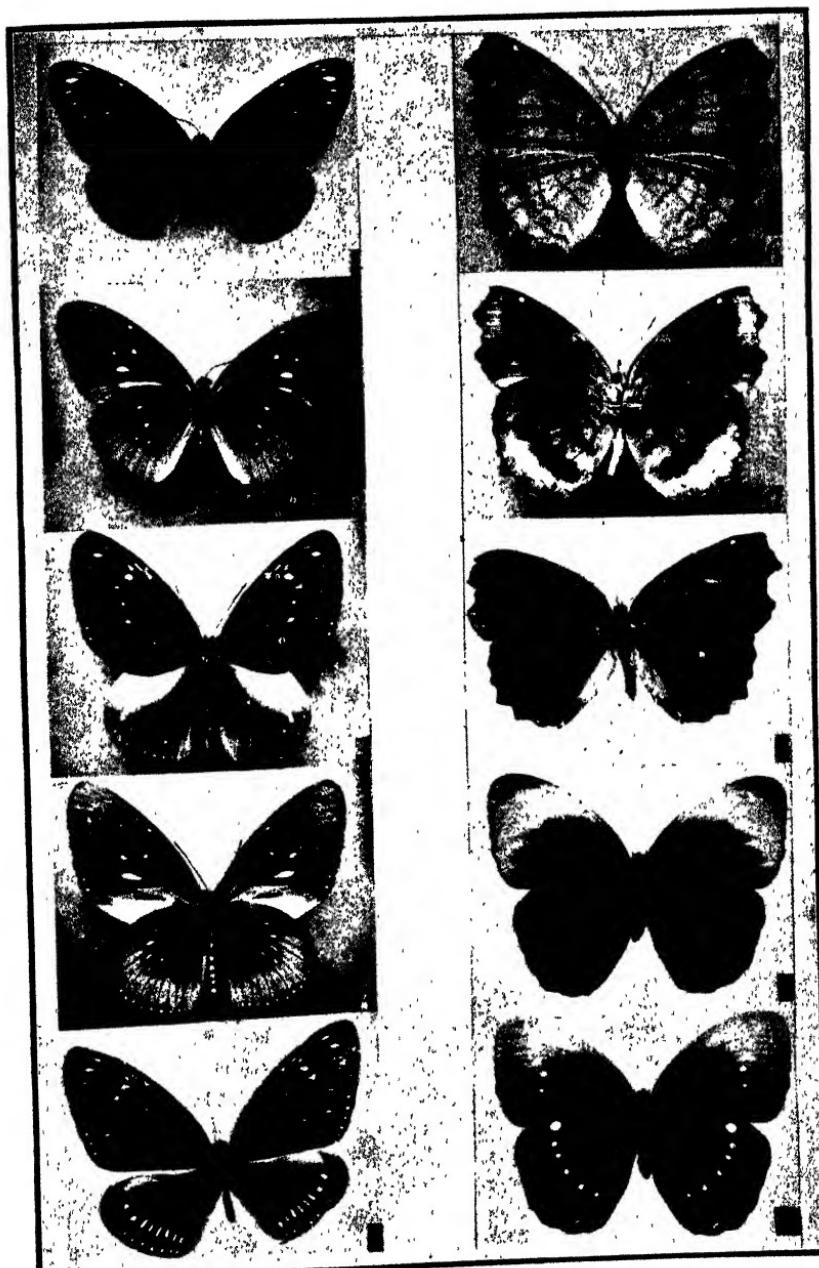
Plate 9

- Fig. 1. *Junonia hirta* (Fabr.), 1798, dorsal side ♂.
 2. *J. hirta* (Fabr.), 1798, ventral side ♂.
 3. *J. hirta* (Fabr.), 1798, dorsal side ♀.
 4. *J. orithya* (Linn.), 1758, dorsal side ♂.
 5. *J. orithya* (Linn.), 1758, ventral side ♂.
 6. *Neptis eurynome* (Westw.), 1842, dorsal side ♂.
 7. *N. eurynome* (Westw.), 1842, ventral side ♂.
 8. *Pantoporia opalina* (Kollar) ?, 1844 or 1848, dorsal side ♀.
 9. *P. opalina* (Kollar) ?, 1844 or 1848, ventral side ♀.
 10. *P. pernus* (Linn.), 1758, dorsal side ♂.

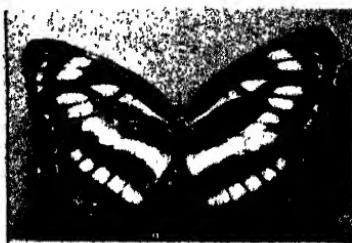
Plate 10

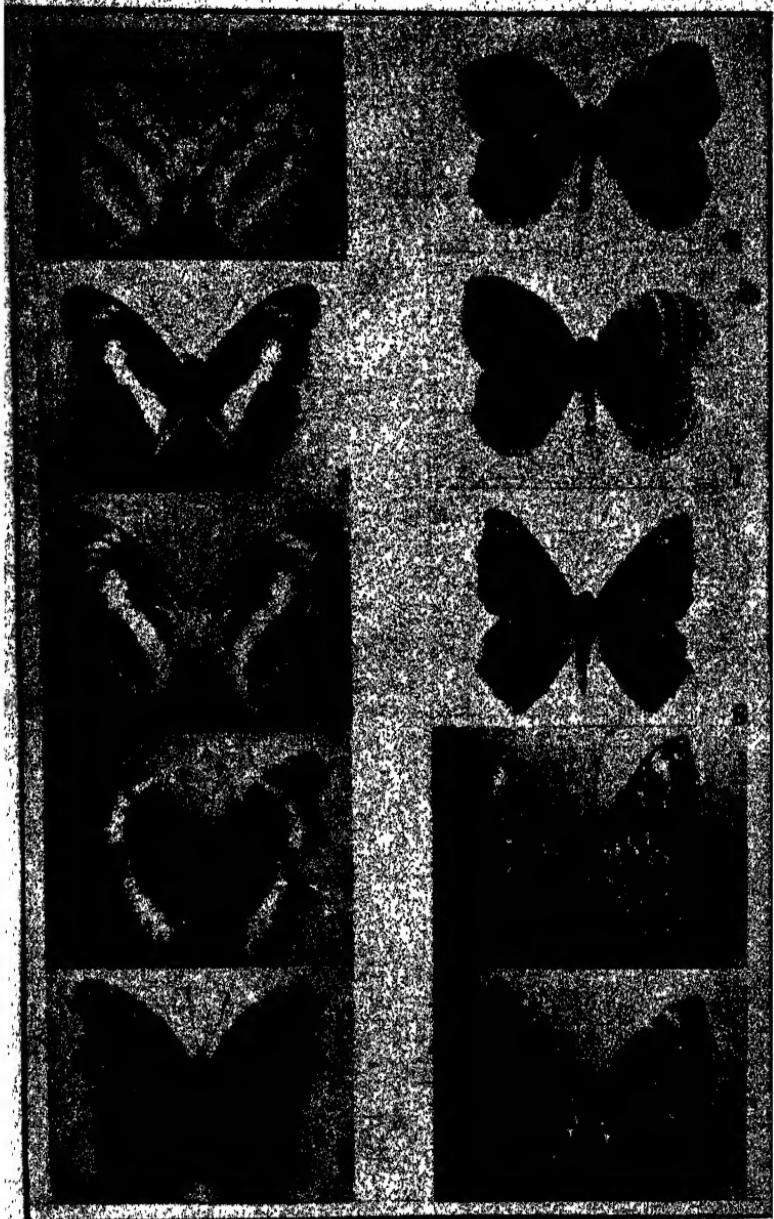
- Fig. 1. *P. perius* (Linn.), 1758, ventral side ♂.
 2. *P. selenophora* (Kollar), 1844 or 1848, dorsal side ♂.
 3. *P. selenophora* (Kollar), 1844 or 1848, ventral side ♂.
 4. *Vanessa canace* (Joh.), 1763, dorsal side ♀.
 5. *V. canace* (Joh.), 1763, ventral side ♀.
 6. *Abisara echerius* (Stoll), 1790, dorsal side ♂.
 7. *A. echerius* (Stoll), 1790, ventral side ♂.
 8. *Zemeros flegyas* (Cramer), 1780 or 1782, dorsal side ♂.
 9. *Z. flegyas* (Cramer), 1780 or 1782, ventral side ♂.
 10. *Z. flegyas* (Cramer), 1780 or 1782, dorsal side ♀.

(To be continued)









SHORTER ARTICLES AND SCIENTIFIC NOTES

Some Experiments on the Extirpation and Transplantation of the Mesonephros in *Rana nigromaculata*.¹--Though the development of mesonephros in *Rana* has been studied extensively in morphological detail, yet it is rarely studied experimentally. The present notes are concerned with extirpation and transplantation of the mesonephros in relation to the problems of the time at which determination occurs, and the question of differentiation when it is transplanted to another region.

In the early gastrula stage when the dorsal lip of the blastopore had just appeared, a rectangular piece of tissue was removed from a region slightly in front of the presumptive material of the pronephros which is believed to be situated slightly laterad to the dorsal lip. The embryo being so operated upon, a mesonephros developed which was normal in all respects, except that its size was sometimes much reduced. In some cases, however, only the posterior portion of the mesonephros was present, the size and the number of mesonephric units being greatly reduced. In such cases, it would appear that the anterior portion of the presumptive material had been removed and that during the course of development it did not form again. This fact leads us to assume that in the former cases after the removal of the tissue, the mesonephros developed normally, the extirpated material probably not including prospective mesonephric tissue, since at this stage the position of the organ is not easy to determine.

Another experiment was performed in the later gastrula stage, when the neural fold had not yet been outlined. A rectangular piece, including ectoderm and underlying mesoderm, was removed from a region laterad to the blastopore. No normal mesonephros was formed in the operated side of the larva. In some cases there existed only a portion of mesonephros, frequently the posterior half; in other cases, that portion was so small that its poorly developed tubules occurred only in two or three sections. Such a small portion of mesonephros was undoubtedly formed from an infinitesimal portion of tissue which was left in its original place.

Some operations were performed in the neurula stage. Owing to the facility of localizing the position of the presumptive tissue, the mesonephros on the operated side was usually completely absent.

In the experiments on the development of the transplanted mesonephros tissue, embryos of different stages as they were used in the experiments of extirpation, were employed. The presumptive mesonephros material was transplanted to the flank of another embryo which was generally in the same stage as that of the donor.

¹ Contribution No. 9 from the Marine Biological Laboratory, Department of Biology, National University of Shantung, Tsingtao.

The development of the grafts varied with the age of donor. If they were taken from the embryos of early or later gastrula stages, they could not continue their development by self-differentiation, remaining generally in the body-wall of the host as a mass of mesodermal cells. On the other hand, grafts taken from an embryo in wide open neural folds stage, could differentiate in the flank of the host into well formed mesonephric tubules. Results, therefore, show that in *Rana nigromaculata* Hallowell the differentiation of mesonephros when grafted is comparable with that of *Triton alpestris*, in which Machemer (1929) by grafting the mesonephric tissue from the neurula to the eye cavity of a host in the tail bud stage, obtained coiled tubules.

From the above observations—though in the early gastrula stage, results are still doubtful and need further investigation—it is obvious that the process of determination of mesonephros has already begun in the later gastrula stage. After the removal of the tissue, no process of regulation occurs; yet the determination is still feeble, since when it is grafted to another place it cannot continue its development in its new environment. The determination, however, is gradually becoming complete by the acquisition of the ability to form mesonephric tubules after being transplanted, though it has not yet been ascertained whether the tubules would be functional or not.

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青 蛙 腎 臟 之 制 除 及 移 植 之 研 究

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(摘要)

在原腸初期，若將背唇左方或右方之腎臟物質割除，腎臟之形狀雖小，然仍能如常發長。

如在原腸後期及神經板期，將腎臟之物質割除，腎臟之發長則不完全。有時僅發生一部，或竟完全缺如。

若將原腸前期及後期之腎臟物質，移植於另一胚胎之腹部，腎臟不能自身分化。反之，若此實驗施行於神經溝期，則腎臟小管，便能在移植之胚胎上產生。

Scarabaeidae Collected by the Lingnan University Fifth Hainan Island Expedition, 1929¹—A total of eighty-six specimens of Scarabaeidae were handed to me by Professor W. E. Hoffmann, of the Lingnan Natural History Survey and Museum, for identification. These were collected on the island of Hainan, off the south coast of China during the period May to August, 1929. Eighteen species are represented in the collection; these belong to the subfamilies Rutelinae, Melolonthinae, Dynastinae, Cetoniinae and Valginae.

Rutelinae

Anomala (Aprosterna) antiqua Gyllenhal, 1817, *in* Schoenherr, Syn. Ins., 1, 3, p. 196.

Five specimens of this widely distributed species were taken, all in the vicinity of Nodoa in June, July and August.

Anomala (Anomala) rotundiceps Sharp, 1881, Notes Leyden Museum, vol. 3, p. 234.

Five specimens were taken at Nodoa in June.

Anomala (Euchlora) cupripes Hope, 1839, Proc. Zool. Soc. London, vol. 7, p. 68.

Nine specimens, all taken in the vicinity of Nodoa from June 26 to July 29, are before me.

Anomala (Euchlora) sp.

Three specimens taken from July 8 to July 17, southwest of Nodoa.

Mimela sp.

A single specimen from near Fooi Ju, northwest of Nodoa, August 20.

Adoretus sinicus Burmeister, 1855, Handb. Ent. vol. 4, Part 2, p. 532

Five examples, all from near Nodoa, were taken between June 25 and August.

Adoretus sp.

Seven specimens from near Nodoa taken from June to August. This species closely resembles *A. sinicus* Burmeister, but differs in the shape of the head and genitalia.

Adoretus sp.

A single specimen from Nodoa in June.

Popillia sp.

A single specimen taken on trail from Naam Fung to Poh Shaang, July 24, 25.

¹ Published by permission of the Secretary of the Smithsonian Institution.

² This expedition was made possible by funds contributed by the China Foundation for the Promotion of Education and Culture. (See *Ling. Sci. Jour.* 6(4) :370; 9(1 & 2) :159.)

Melolonthinae**Apogonia** sp.

A single specimen from Nodoa in June.

Dynastinae

Xylotrupes gideon Linnaeus, 1767, Syst. Nat., Ed. 12, vol. 1, Part 2, p. 541.

Two males of this species, one from near Nodoa, the other from Man Fook village, July 19.

Cetoniinae

Agestrata orichalcea Linnaeus, 1789, Amoen. Acad. vol. 7, p. 507 (*Scarabaeus*).

Five examples of this large and showy species were taken near Nodoa in June and July.

Euselates schoenfeldti Kraatz, 1893, Deutsch. ent. Zeitschr., p. 72.

Five specimens taken June 25, 26, two miles south of Nodoa.

Calopotosia sp.

One specimen from Man Fook Chuen, south of Nodoa, July 19.

Protaetia fusca Herbst, 1790, Natursyst. Kaf. vol. 3, p. 257, pl. 32, fig. 4 (*Cetonia*).

Eight examples, June 27 and July 19, taken south of Nodoa. The July 19 specimens are from Man Fook Chuen.

Glycyphana horsfieldi Hope, 1831, in Gray, Zool. Misc. p. 25 (*Cetonia*).

Three specimens from Man Fook Chuen, south of Nodoa, July 12. The island of Hainan lies a considerable distance outside the recorded distribution of this species but I feel reasonably sure of the species.

Oxycetonia jucunda Falderman, 1835, Mem. Acad. Petersburg, vol. 2, p. 386, pl. 4, fig. 4, 5 (*Cetonia*).

Nineteen specimens, June 24 to July 29, from various localities near Nodoa. Several of the color forms are represented in the series.

Valginae**Dasyvalgus** sp.

Eight examples of one of the smaller species of this genus from Chue Mo Ling, August 24, Woh Hau Chuen, August 19 and near Nodoa, July 1.

EDWARD A. CHAPIN

CURATOR OF INSECTS

U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

民國十八年嶺南大學第五次在海南島採集之金龜子科

E. A. Chapin 著 (摘要)

本名錄包括十八種，分屬五亞科。

Distributional and Biological notes on some Kwangtung Diptera¹—The present paper includes about ninety species of flies representing some two dozen families. Practically all of the species were taken on Kwangtung mainland, mostly in or near Canton, but a few of them were collected in Hainan Island. The bulk of the specimens were collected by the late C. W. Howard, or under his supervision. He also undertook a certain amount of rearing work. Most of the specimens were sent to Dr. M. Bezzì of Torino, Italy, for determination. One of three boxes of specimens sent to Dr. Bezzì was badly damaged thus making some of the determinations uncertain. These specimens were retained in Dr. Bezzì's collection until there should be an opportunity to compare them with further material sent from Canton. So far as we can ascertain no further specimens were sent from Canton and the damaged specimens, and possibly certain others, in Dr. Bezzì's care were not returned. This fact accounts for a number of the specimens being labeled "Canton, probably 1919, C. W. Howard." Specimens so labeled are not in our collection and we have no way of ascertaining the exact data. Some of them may have been reared specimens. A letter, dated June 29, 1923, written by Dr. Bezzì, and which has only recently come to light, contains the names of about fifty Kwangtung species. This list, along with some specimens in a rather poor state of preservation, has made possible the preparation of the present list. Unfortunately the names of several of the species on Bezzì's list cannot be deciphered and had to be omitted.

It has been with considerable difficulty that the present notes have been brought together. In the first place the identification labels are in Dr. Bezzì's longhand which is particularly difficult to read. Not having access to any catalogues of Diptera it has been necessary to search through many articles in periodicals and numerous reprints in an effort to learn the correct spelling of the names and the author names therefor. A number of the species could not be found in any of the literature available to us. In the second place difficulty was encountered in tracing the locality data or the rearing data, or both, for this entailed a search for the records indicated by both the accession numbers and the rearing numbers attached to the specimens.

There is no indication as to who is responsible for the names of the Tabanids in the collection. A few flies were kindly determined for me by the late Dr. Aldrich and are so indicated.

The present paper omits the Culicids which were collected or reared by Prof. Howard for these were dealt with in an article by Dr. W. A. Riley (*Ling. Sci. Jour.* 11(1):25-35, 1932). This list completes the placing on record of the information we have on our "Old Collections" of Diptera, specimens of which were collected many

¹ Contribution from the Lingnan Natural History Survey and Museum.

years before we had proper facilities for their care and are for the most part in too poor a condition to warrant further study. No reference is here made to material which has been acquired during the last decade and is in excellent condition.

AGROMYZIDAE

Agromyza phaseola Coquillett

Canton Christian College (Lingnan University), September 1920,
A. S. Campbell.

Agromyza sp.

No data are available.

ANTHOMYIIDAE

Atherigona excisa Thoms.

Canton, probably 1919, C. W. Howard.

Atherigona sp.

Canton, October 1918, bred from diseased areas on papaya fruit,
C. W. Howard; Loh Fung Monastery, April 9, 1919, apparently
from an old water jar, C. W. Howard. Canton, Nov. 25, 1925, W.
E. Hoffmann, det. Aldrich.

Lispa sp.

Canton, Nov. 27, 1925, W. E. Hoffmann, det. Aldrich.

Ophyra chaliscaster W.

Canton, probably 1919, C. W. Howard.

Pygophora sp.

Canton, May 29, 1919, on Beans, C. W. Howard; Canton, Nov.
25, 1925, W. E. Hoffmann.

ASILIDAE

Microstylum sp.

Canton, probably 1919, C. W. Howard.

Ommatius chinensis F.

Canton, probably 1919, C. W. Howard.

Philodicus sp.

Canton, probably 1919, C. W. Howard.

Tolmerus sp.

Canton, probably 1919, C. W. Howard.

BIBIONIDAE

Plecia fulvicollis F.

Canton, probably 1919, C. W. Howard.

BOMBYLIIDAE**Caenotus** sp.

Canton, probably 1919, C. W. Howard.

Hyperalonia leuconae? Jaenicke

The species name is not legible.

Canton, probably 1919, C. W. Howard.

Petrorossia fulunla W.

Canton, probably 1919, C. W. Howard.

CALLIPHORIDAE**Calliphora** sp.

Canton, Nov. 1, 1917. Meat in jar in laboratory was visited by flies on this date, larvae were seen about November 10, pupation in soil was begun November 15, adult emerged Jan. 23, 1918, C. W. Howard.

Lucilia cyaneomarginata May.

Canton, June 20, 1919, C. W. Howard.

Lucilia sp.

Canton, 1919, C. W. Howard.

Lucilia sp.

Canton, Nov. 24, 1925, W. E. Hoffmann, det. Aldrich.

Rhinia testacea N.D.

Canton, June 20, 1919, C. W. Howard.

DEXIIDAE**Dexia** sp.

Canton, June 20, 1919, C. W. Howard.

DOLICHOPODIDAE**Diaphorus** sp.

Canton, Nov. 25, 1925, W. E. Hoffmann, det. Aldrich.

EPHYDRIDAE**Ochthera** sp.

Canton, Nov. 27, 1925, W. E. Hoffmann, det. Aldrich.

HIPPOBOSCIDAE**Lynchia maura** Bigot

Honam I., Canton, May 14, 1918, C. W. Howard.

LEPTOCERATIDAE**Limosina** (now **Leptocera**) sp.

Canton, probably 1919, C. W. Howard.

LIMONIIDAE**Eriocera** sp.

Canton, probably 1919, C. W. Howard.

Eriocera sp.

Canton, probably 1919, C. W. Howard.

MUSCIDAE**Anoplomus flexuosus** Bezzi

Hainan I., grove 1.5 mi. S. of Nodoa, June 27, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., near Nodoa, July 19, 1929, Lingnan University Fifth Haiman Island Expedition.

Bengalia varicolor Fabricius

Canton, probably 1919, C. W. Howard.

Caiusa indica Ware

Canton, probably 1919, C. W. Howard.

Chrysomyia megacephala Fabricius

Canton, probably 1919, C. W. Howard.

Chrysomyia sp.

Canton, Nov. 24, 1925, W. E. Hoffmann, det. Aldrich.

Compsomyia dux Esch.

Canton, April 1, 1918, in fertilizer kang, C. W. Howard; Canton, Aug. 6, 1918, C. W. Howard; Honam I., bred from larvæ collected in wine jars and fertilizer kangs July 25, 1919, C. W. Howard; Canton, University campus, larvae in decaying meat, Aug. 1-15, 1919, C. W. Howard.

Cryptolucilia lauta W.

Canton, probably 1919, C. W. Howard.

Cryptolucilia sp. nr. **lauta** W.

Canton, Nov. 24, 1925, W. E. Hoffmann, det. Aldrich.

Cyphocera javana W.

Canton, University campus, April 25, 1920, C. W. Howard.

Diarrhegma modesta Fabricius

Canton, University campus, Aug. 28, 1918, C. W. Howard. Breeding in fermenting castings of Cerambycid larvae in decayed areas in *Melia azedarach* L. The larvae about the size of those of *Musca domestica* L. but more slender. "On venter at posterior end the larva can put out two large pouches in the last stage. Also the older larvae, when on an unfavorable surface, will draw the head to the posterior end and spring five or six inches into the air and away."—C. W. H. August 31, two adults emerged. One maggot seen feeding on dead larva of Cerambycid beetle.

Mintho sp.

Canton, probably 1919, C. W. Howard.

Musca domestica Linnaeus

Honam I., emerged April 13, 1918, from larvae collected in fertilizer kong on April 1; Canton, April 16 and Aug. 6 & 9, 1918, C. W. Howard; Campus, Jan. 30, 1920, C. W. Howard; Loh Kong, Feb. 1, 1920, C. W. Howard.

Musca hamibi W.

Canton, April 4, 1918, from larvae collected March 21 in fertilizer pit, C. W. Howard; Canton, January 31, 1919, C. W. Howard; Canton, reared from larvae collected in pig manure and also in water buffalo manure on July 25, 1919, C. W. Howard.

Musca humilis W.

Canton, probably 1919, C. W. Howard.

Musca pattoni Aust.

Honam I., Canton, April 28, 1919, C. W. Howard.

Musca sp.

Canton, Nov. 27, 1925, W. E. Hoffmann, det. Aldrich.

Passeromyia heterochaeta Villeneuve

Canton, Oct. 18, 1919, adults emerged from larvae collected October 4 inside a young nestling pigeon which had been dead for two or three days. Pupation occurred on October 4, C. W. Howard; larvae collected Jan. 5, 1920, in pigeon nest where pigeon nine days old was killed. Over one hundred larvae were found under the nest, C. W. Howard. In a letter of April 28, 1921, Dr. Bezzi refers to the larvae of this species as being blood-sucking on birds.

Philaematomyia crassirostris Herd.

From golden colored larvae in buffalo dung July 25, 1919, C. W. Howard. The dung was old enough to be well dried on the upper surface; Honam I., Canton, July 31, 1919, C. W. Howard.

Philaematomyia lineata Brun.

Reared from whitish larvae found in water buffalo dung at Canton, July 25, 1919, C. W. Howard.

Prosena sp.

Loh Fung Monastery, April 10, 1919, in tremendous numbers eating the flowers of roses, C. W. Howard.

Pseudopyrellia lauta W.

Canton, adults emerged Sept. 5, 1918, from larvae collected in water buffalo dung on Aug. 28, 1918, C. W. Howard.

Pyrellia obscuripes

Canton, probably 1919, C. W. Howard.

Stomoxys calcitrans Linnaeus

Canton, Sept. 6, 1918, C. W. Howard; Honam I., Canton, March 15 & May 5, 1920, C. W. Howard; Canton, Nov. 25, 1925, W. E. Hoffmann, det. Aldrich.

Tricholyga sorbillaris Wied.

Canton, Aug. 28, 1920, from maggots found parasitizing silk-worm larvae in laboratory on Aug. 17. The maggots leave the larvae as they are spinning cocoons. C. W. Howard.

MYCETOPHILIDAE**Allactoneura cineta** de Meijere

Canton, probably 1919, C. W. Howard.

PIPUNCULIDAE**Pipunculus** sp.

Canton, Nov. 25, 1925, W. E. Hoffmann, det. Aldrich.

PLATYSTOMATIDAE**Rivellia basilaris** Wied.

Canton, July 7, 1926, W. E. Hoffmann, bred from fruits of *Solanum nigrum* L., det. Aldrich.

RHAGIONIDAE**Leptis** sp.

Canton, probably 1919, C. W. Howard.

SARCOPHAGIDAE

Sarcophaga sp.

Canton, April 19, 1918, apparently came from burrows in twig containing pupae and adults of a Cerambycid beetle, C. W. Howard; Sept. 6 & 19, 1918, C. W. Howard; Loh Fung Monastery, April 9-10, 1919, C. W. Howard; Canton, Aug. 1-15, 1919, bred from decaying meat, C. W. Howard; Campus, June 10, 1918?, T. O. Lei; without locality, May 25, 1920.

Sarcophaga sp.

Canton, Nov. 27, 1925, W. E. Hoffmann, det. Aldrich

STRATIOMYIDAE

Geosargus mactans Walker

Canton, probably 1919, C. W. Howard.

Psecticus insignis de Meijere

Canton, probably 1919, C. W. Howard.

SYRPHIDAE

Asarcina aegrota Fabricius

Canton, probably 1919, C. W. Howard.

Asarcina ericetorum Fabricius

Canton, probably 1919, C. W. Howard.

Eristalis aruorum Fabricius

Canton, probably 1919, C. W. Howard.

Eristalis laetus W.

Canton, probably 1919, C. W. Howard.

Eristalis quinquestriatus Fabricius

Canton, probably 1919, C. W. Howard.

Eristalis tenax Linnaeus

Canton, March 18, 1920.

Ischiodon scutellaris Fabricius

Canton, probably 1919, C. W. Howard.

Megaspis errans F.

Canton, probably 1919, C. W. Howard.

Megaspis zonata F.

Ting-wu Shan, April 26, 1918; Canton Christian College (now Lingnan University), May 17, 1920; Honam I., Canton, April 20, 1926, K. S. Pang, det. O. Piel.

***Microdon* sp.**

Canton, April 9, 1928, on bamboo, Y. M. Leung, det. O. Piel.

***Syrphus nectarinus* W.**

Canton, probably 1919, C. W. Howard.

TABANIDAE***Chrysops dispar* F.**

Honam I., Canton, May 10, 1918, C. W. Howard.

***Chrysops indianus* Ricardo**

Honam I., Canton, May 10, 1918, C. W. Howard.

***Chrysops melokosiewiczi* Bigot**

Honam I., Canton, May 1, 1918, C. W. Howard; Loh Fung Monastery, April 9-10, 1919, on mountain among trees, C. W. Howard; Honam I., Canton April 1, 1920, C. W. Howard; Loh Kong, May 1, 1920, C. W. Howard.

***Chrysops sinensis* Walker**

Honam I., Canton, Oct. 20 and Dec. 11, 1918, C. W. Howard; Honam I., Canton, March 25, 1919, C. W. Howard; Canton Christian College (now Lingnan University), Canton, May 5, 1920, C. W. Howard.

***Chrysops* sp.**

Honam I., Canton, Oct. 10, 1918, and April 1, 1919, C. W. Howard.

***Chrysops* sp.**

Shek-lung, Kwangtung Province, July 21, 1921, C. W. Howard.

***Haematopota tessellata* Ricardo**

Honam I., Canton, May 1, 1918, C. W. Howard; Honam I., Canton, April 20 & 23 and May 10, 1919; Shiuchow, northern Kwangtung, May 4, 1919, collected in shrubbery along road to Naam Wa Monastery, Ma Pa Valley, C. W. Howard.

***Tabanus ditaeniatus* Macquart**

Honam I., Canton, Aug. 9, 1918, in house, C. W. Howard.

***Tabanus striatus* Fabricius**

Honam I., Canton, Aug. 10, 20, 23, 26, 1918, C. W. Howard; Canton Christian College (now Lingnan University), Canton, May 30, 1918, T. O. Lei; Honam I., Canton, July 31, 1919, C. W. Howard; Honam I., Canton, May 28 and June 1, 1920, C. W. Howard; Canton Christian College (now Lingnan University), Canton, June 2, 1920, C. W. Howard.

Tabanus sp.

Honam I., Canton, April 17, 1920, C. W. Howard.

Tabanus sp.

Honam I., Canton, Aug. 9, 1918, in house, C. W. Howard.

TACHINIDAE**Actia** sp.

Canton, Nov. 25, 1925, W. E. Hoffmann, det. Aldrich.

Idiella sp.

Canton, Nov. 27, 1925, W. E. Hoffmann, det. Aldrich.

TETANOCERATIDAE**Sepedon** sp.

Canton, probably 1919, C. W. Howard.

TIPULIDAE**Conosia irrorata** (Wied.)

Canton, probably 1919, C. W. Howard.

Pachyrrhina sp.

Canton, probably 1919, C. W. Howard.

TRYPETIDAE**Callistomyia pavonina** Bezzii

Hainan I., Mei Foo Chuen, near Nodoa, Aug. 13, 1929. Lingnan University Fifth Hainan Island Expedition.

Chaetodacus cucurbitae (Coquillett)

Canton Christian College (now Lingnan University), Canton, May 29, 1918, on beans, C. W. Howard; Honam I., Canton, Oct. 10, 1918, C. W. Howard; Canton, June 15, 1926, on *Cucumis sativus* L., W. E. Hoffmann; Canton, July 1926, on *Vigna sesquipedalis* W. F. Wight, W. E. Hoffmann; Hainan Island, grove NE. of Nodoa, July 1, 1929, Lingnan University Fifth Hainan Island Expedition.

We also have specimens in our collection which were collected at Ningyuefu, Szechwan Prov., by D. C. Graham on July 31, 1928.

Chaetodacus ferrugineus Fabricius

Canton Christian College (now Lingnan University), Canton, May 29, 1918, on beans, C. W. Howard.

WILLIAM E. HOFFMANN

誌廣東雙翅目昆蟲之分佈及其生態

賀輔民著

嶺南大學自然博物採集所

(摘要)

此蠅類名錄包含九十品種，分屬廿四科。中多採自廣州及其附近各地，惟採自海南島者為數甚少。此文除誌明各品種之分佈外，對其生態亦間有述及焉。本文不包括蚊類蓋前曾經發表矣。

GENERAL NOTES

Biological Abstracts

Recently a small booklet on plans for the future of *Biological Abstracts* has come to our attention. We are pleased to learn that the Committee on Arrangements has been making a vigorous campaign to keep the service in operation. The program for 1938 is as follows: 1. The journal must become self-supporting. 2. It must become prompt in the publication of its abstracts and indexes. 3. All biologists and institutions interested in any phase of biological work must cooperate. The new plan for financing the journal is explained more fully in *Science* for December 17, 1937, pages 561-563. By this plan each institution will become a *master subscriber*, the cost of the subscription depending on the number of biologists in the institution, exclusive of graduate students. Additional copies may be obtained for departmental and other branch libraries at a cost of \$7.00 a year. Individuals connected with institutions which are master subscribers may secure personal subscriptions at \$7.00 a year. It is hoped that with wide support it will be possible within two years to furnish the Abstracts to all libraries at a low flat rate, approaching that at which *Chemical Abstracts* is sold. It is probable that the Abstracts cannot achieve sufficient popular support to be published at a low rate unless it furnishes a better news value than has sometimes been the case in the past. It is planned to extend the author-to-editor abstracting plan, by which author abstracts are furnished at the time of original publication of the paper. Payments are to be made to collaborators handling entire journals. This plan will make possible an understanding between the abstractors and the editorial office as to how much time can be allowed for abstracting. It is expected that abstracts from cooperating journals will appear about eight weeks after the original articles, those prepared by paid collaborators after about twelve weeks. An April-May appearance of indexes has been promised.

With more than 50,000 articles appearing yearly in the biological field, published in 6000 journals in over 25 languages, the need for abstracting service is self evident. While there are many review journals that cover limited fields, important progress in one field often springs from advances or suggestions from another . . . A review journal or highly specialized abstracting journal is less well adapted to serve the biologists who are creating and synthesizing knowledge than is a general abstracting and indexing journal." It was to fill this need for synthesis that *Biological Abstracts* was sponsored by the Union of American Biologists, in 1926. During the formative years the Rockefeller Foundation generously contributed three-quarters of a million dollars to the journal. With the experimental work past continuation of the service must depend on the interest and support of biologists generally. In this transition period the Periodicals Committee of the American Library Association is cooperating with the Committee on Arrangements and the Union of American Biologists in a program for the permanent establishment of *Biological Abstracts*. The work of these organizations deserves the support of all who are interested in scientific progress.

Leaflets of Philippine Botany

The editor of this work, which was begun in 1906, announces that this publication will cease with Volume 10 including a general index. Libraries possessing this work will be interested in the following information. "Due to a mistake the pages for errata and index of volume 8 from 3107 to 3120 inclusive should be considered cancelled, since they are used in articles 122 and 123, the beginning of volume 9. This change does not render useless the errata and index for volume 8, but to avoid confusion the above errata and index pages should be crossed out."

Seventh International Congress of Entomology

The Seventh International Congress of Entomology and the various functions connected therewith will be held in Berlin from August 14 to 28, the Congress proper on August 15 to 20. The Congress will be divided into general sessions and sectional meetings. The program is to be divided between General Entomology and Applied Entomology, the former being subdivided into : (1) Systematic Entomology and Zoogeography, (2) Nomenclature and Bibliography, (3) Morphology, Physiology, Embryology and Genetics, (4) Ecology. The Applied Entomology is subdivided as follows : (1) Medical and Veterinary Entomology, (2) Apiculture and Sericulture, (3) Forest Entomology, (4) Agricultural Entomology, (5) Protection of Nature, Teaching. No. 4, for convenience, is being still further divided. The official languages of the Congress are English, French, German, Italian, Portuguese and Spanish. As in the case of former Congresses, the proceedings will be published.

Marine Studios

Marine Studios, Marmelard, St. Augustine, Florida, have established an enterprise which will be of interest to the world and of very great significance to science. They have established two of the largest aquaria ever built, and the only aquaria in the world so designed as to enable marine fish, turtles, and aquatic mammals to exist together under natural conditions in a miniature ocean. More than two hundred port holes, or observation points, permit the visitor and the scientist to observe and take photographs and motion pictures of animals which in the past have been seen alive only by deep sea divers. In accomplishing this task, coral gardens have been taken from the sea and transplanted to the aquaria and marine vegetation planted. The tanks were designed by technical motion picture experts, who worked out in advance the various camera angles that would be necessary for the most successful filming. The portholes, made of clear plastic glass, are built in the sides of the wall at various levels. In order to secure some of the large sharks, porpoises and giant rays a special boat was constructed in the hull of which is a well and in the stern of which a large trapdoor is located. The well is completely water-tight. In its center a metal tank is placed on rollers so that it can be easily lowered through the trapdoor into the water. The large fish are brought to the boat in nets, given hypodermic injections to render them unconscious, maneuvered into the tank, and pulled into the boat uninjured. At the shore this metal tank is transported by crane and deposited in a flume where the fish is allowed to regain complete consciousness before being placed in the aquarium. The promoters of this plant must be credited with the establishment of something of outstanding value to the general public and to science.

BOOKS AND SPECIAL PUBLICATIONS

LAND UTILIZATION IN CHINA, by JOHN LOSSING BUCK. A study of 16,786 farms in 168 localities, and 38,256 farm families in twenty-two provinces of China, 1929-1933, in 3 volumes. Published by the University of Nanking. Exclusive distributors: for China, Commercial Press, Shanghai; for United States, University of Chicago Press, Chicago; for Great Britain and the Continent, The Oxford University Press, London. 1937. Price: 1 yuan 30.00 per set.

Volume 1.—Size 6 by 9 inches (in English). 494 pages. There are 21 maps, 57 figures, 62 photographs and glossary and index in this volume. The preface explains fully the method and scope of study: to show the present state of land utilization in China and its implications to the country's economic development and welfare. The major characteristics of Chinese agriculture are revealed in the general setting of the nation's rural life and economy. Although China is a large country and the subject an exceedingly broad one Professor Buck has succeeded in making a most thorough inquiry into the rural life of China and the effects of the various phases of land utilization upon economic conditions. For example, information on the variety of uses of land on individual farms is brought into relation not only with soil conditions, topography, and climate, but also with the density of population, the composition of the farm household, the adequacy of the food consumption, the amount of labor expended on the land and its reward, the general plane of living and other social factors. The discussion is in six sections: (1) Land, food and population; (2) Physical factors; (3) Man's use of the land; (4) Marketing and prices; (5) Population; and (6) Standards of living. Two hundred tables of data are presented under eight agricultural areas which, from north to south, are called: (1) Spring wheat area; (2) Winter wheat-millet area; (3) Winter wheat-kaoliang area; (4) Szechwan rice area; (5) Yangtze rice-wheat area; (6) Southwestern rice area; (7) Rice-tea area; (8) Double cropping rice area. The data is also presented for the two major agricultural regions of China, the wheat region in the north and the rice region in the central and southern portions of the country. Chapter XIV describes the methods of determining regional boundaries and gives a summary of the characteristics of each region.

Volume 2.—*Atlas*. Size 17 $\frac{1}{4}$ by 12 $\frac{1}{4}$ inches (Bilingual: Chinese and English). The land utilization of China, the natural forces which influence that utilization, and the social and economic data which are related to it, are represented in 180 large-scale maps, with 7 figures and 13 aero photos. The enumeration of the crops and percentage of crop area tabulated in this volume is of immense value to students of plant life as related to climate, soils and crop production.

Volume 3.—*Statistics*. Size 18 by 12 $\frac{1}{4}$ inches. 492 pages. This is an appendix volume giving detailed data for the 100 farms studied in each of the 168 localities. As can be expected one naturally looks for localities not surveyed; and some of those which one knows intimately seem inadequately treated.

All three of these volumes are indispensable for students of China and will prove most valuable to the country's reconstruction.

G. WEIDMAN GROFF.

MOSAICS AND OTHER ANOMALIES AMONG ANTS, by WILLIAM MORTON WHEELER. Svo., cloth, 95 pages, bibliog., Harvard University Press, Cambridge, Mass., 1937. \$2.00 U.S. cy.

This little book possesses a pathetic interest since it was a post-mortem publication of its distinguished author, the greatest American authority on ants and perhaps the greatest in the world. During the year 1935, Dr. N. A.

Weber, while holding a National Research Fellowship and pursuing his investigations in B. W. I., collected the entire personnel of two large ant colonies which contained unprecedented numbers of anomalous individuals. In one of these colonies, belonging to a large Cryptocerine, there were more than 4,000 remarkable gynandromorphs, or female-male mosaics. One of the other colonies was that of a fungus growing (Attine) ant, *Acromyrmex octospinosus* Reich, containing only 164 anomalous individuals, fifty-three of which were of unusual interest both because they were quite unlike any previously observed among ants or indeed among any other social insects and because they enable specialists to decide between two theories of caste determination which have baffled and divided students of ants for more than half a century, and it is with these themes that this little volume deals. Since these anomalies happen to appear in an ant that is also of considerable interest to animal behaviorists and economic entomologists, there have been included a number of observations on its fungus growing habits and those of other members of the Attine tribe. To the principal paper there is also appended a revision of the known non-mosaic ant anomalies, because these appear in a new light as a result of the studies of the *A. octospinosus* anomalies. The bibliography includes 135 titles.

GARDENING INDOORS, by F. F. ROCKWELL and E. C. GRAYSON, small 8vo., cloth, 201 pages, 42 illus., Macmillan Company, N. Y., 1938. \$2.50 U. S. cy.

Space for notice of this modest little volume is being given in the Lingnan Science Journal because of the excellence of its treatment of some of the more modern problems dealing with indoor growing of plants and its possible usefulness to professional botanists and others who may have experienced trouble in carrying on to success their plant experiments through the development of air conditioning in various types of laboratories and work rooms, and also because of its discussion of plant growth under new methods of heating and moisture control, and the development of the so-called "sun room," and the explicit and detailed information given therein concerning the selection under varying indoor conditions of the right plants for growth, how to care for them, how to propagate and protect them, and how to use them to best advantage. While prepared primarily for use of those interested in home decoration and the enjoyment of living plants and flowers all the year round, it also contains, in addition to the features already mentioned, résumés of recent discoveries in connection with containers, and with fertilizers, and with arrangements and groupings. Some of the other subjects discussed include types of indoor gardening; miniature gardens; soils and bulbs; insect and other troubles; flowering plants; foliage plants; vines and creepers; ferns; cacti; and shrubs and annuals.

THE MAKING OF A SCIENTIST, by RAYMOND L. DITMARS, small 8vo., cloth, 258 pages, illus., Macmillan Company, N. Y., 1937. \$2.75 U. S. cy.

This little book forms a continuation of a series somewhat autobiographical in character, notices of the previous volumes of which have appeared from time to time in the Lingnan Science Journal. (See 11(1) : 149-150, March 1932; 12(3) : 458, July 1933; and 14(3) : 529, July 1935.) Like its predecessors, this volume comprises in part accounts of episodes and adventures in the career of one of our well known scientists, and in part it comprises much curious and interesting information concerning the various far-away places visited and described, and the varied forms of animal life studied in their native habitats or collected and taken back for the New York Zoological Park of which Dr. Ditmars has long been director. The distinguished author, himself, says regarding this latest volume of the series, "This is a book about a scientist's good times and some of his disappointments." It is gratifying to his readers that the author's scientific interests are sufficiently wide and varied to enable him to include in the book much that is of unusual and

sometimes dramatic interest as well as of practical value concerning the various ramifications of his multiple studies, and it is here shown that this very fact has added considerably to his zest for life. Books of this kind, when well written, have a definite place in stimulation of other, especially our youth, to emulate the author's good example in studying the works of nature, and will cause more people to give thought to what goes on behind the scenes in the offices and laboratories which they do not see in visiting an average zoo. Some idea of the general scope of the contents of this work may be gained by enumeration of some of the chapter headings: Episode of the thousand flies; The private life of *Atticus yanamana*; Strange party of three; Tangents; Diamond-backs; Dew in the desert; New slants at the monkeys; Problems of a bear hunt; A quiet night; Hurricane; The whys of a snowstorm; Chain of islands; Quest of the giant bat; Snake nursery; and The paradox frog. "This book shows how exciting and important it is to know why things happen, rather than merely to see what is going on."

STRANGE BIRDS AND THEIR STORIES, by A. HYATT VERRILL, small 8vo., cloth, 203 pages, 3 colored plates, 105 illus., Page Company, Boston, 1938. \$2.50 U.S. cy.

This is the fourth volume of a series entitled "Strange stories from nature," those already published being on shells, insects, and reptiles. Like those previously issued, the author, in this, has endeavored to describe the unusual, the little known, and the spectacular attributes and habits of birds of the various countries of the world, selecting where possible those species that might most readily be found and observed in their natural haunts or in the principal zoological gardens. Written in semi-popular style, there have been interwoven in the narration many personal anecdotes from the author's observations pertaining to life history, migration and the like. The subject subdivisions include treatment of such themes as bird mysteries and puzzles; how birds play hide and seek; feathered fishermen and pirates; the bird that shaves; strange bird nests; winged jewels; bird pugilists; the bird with four feet; gaudy cousins to the crow; feathered dancers; a flamingo city; bird law courts; birds who use incubators, and so on. There is also a chapter on the most valuable birds in the world and another on the strange birds of the past.

ANIMAL NUTRITION, by LEONARD A. MAYNARD, 8vo., cloth, 483 pages, 36 illus., McGraw-Hill Co., N. Y., 1937. \$4.00 U.S. cy.

This, the latest addition to the well known McGraw-Hill series of publications in the Agricultural Sciences, undertakes to present the essential principles of nutrition and their applications with special reference to the feeding of domestic animals. The essentials of nutritional chemistry and physiology are presented and especial attention has been given to the contributions of the newer knowledge of nutrition to ordinary feeding practice. Some idea of the general scope of this work may be gained by an enumeration of some of the more important subject subdivisions, such as treatment of the expanding field of nutrition; the animal body and its food; some physical bases of life processes, the carbohydrates and their metabolism; the lipids and their metabolism; the proteins and their metabolism; the inorganic elements; the vitamins; feeding experiments on determination of digestibility; nutritional balances; measurements of total nutritional energy; the fasting catabolism; growth; reproduction; lactation and work production. It will be found from a study of this work that present day knowledge of the principles of nutrition and of their application is far from complete. New discoveries are constantly being reported. In adding to knowledge they inevitably also cause some modification in ideas previously held. Likewise it is equally certain that some of the reported discoveries prove to be only partly true. It is obvious therefore that a book of this character must portray these developments, but must at the same time avoid finality in matters which are still more or less in dispute or which require further testing as regards their

practical applications. Such has been the aim of the author in preparation of this work. In presentation of current ideas which may be still in dispute, either as to fact or as to application, the literature which gives divergent viewpoints is cited so that the student may have opportunity to form his own judgment. It should be emphasized that the same underlying principles outlined in the book have found application in the conservation of wild life, the commercial rearing of fish and game, and even in the control and propagation of insects. Differences in anatomy and physiology and in food supply modify the application of the principles but do not destroy their basic usefulness. All these facts are brought out in this book by using experiments with a variety of species as illustrations of the discussions. The modern child learns that there are such things as vitamins almost before he knows his alphabet, and the reader of current popular articles and especially of food advertising is likely to conclude that perhaps the field is already overexpanded. Therefore, it seems particularly desirable that there be made available in a clearly written understandable form a work of this character to which the student may refer when needed.

THE LADY AND THE PANDA, by RUTH HARKNESS, 12mo., cloth, 288 pages, 28 illus., Carrick and Evans, N.Y., 1938. \$2.50 U.S. exy.

This is a narration of scientific exploration in Asia undertaken in 1936 by representatives of the Brookfield Zoo in Chicago. Dr. William H. Harkness, the leader of the expedition died in Shanghai while waiting to obtain permission to enter Western China in search of specimens of the giant panda and other faunal material from that region. The leadership of the expedition having been taken over by his wife, assisted by her associates, and with the co-operation of a highly intelligent young Chinese explorer and hunter, the first half of the book is taken up with details of preparation and gathering together of necessary equipment and the record of journey of some 1,500 miles by river steamer from Nanking in a general westerly direction to Chengtu. From that place the travel was on foot and in various types of conveyances, notably, one called a *wha-gar*, carried by natives, and much of the remainder of the volume is given over to discussion of the various features of the almost unknown border-land country of Szechwan between China and Tibet, the manners and customs of the inhabitants, the hardships of the journey to and from that region, and details of the various captures made of living animals. The actual capture of the baby giant panda, the principal quarry located, was not dramatic, since it appears to have been merely a matter of stumbling on to a baby panda that apparently had been temporarily deserted by its mother. When found it was not more than ten days old and weighed about two and a half pounds. Their subsequent experiences in keeping this little creature alive and in taking it back to its present location in Chicago, forms one of the most diverting and more interesting portions of the narrative. Mrs. Harkness fed it dried milk, swathed it in diapers, and at night took it into bed with her, and otherwise treated it much as one would treat a human orphan of similar age. Since the expedition had hoped to capture and bring back an adult panda of some three hundred pounds and were unable to do so, the keeping alive of the tiny creature was a particularly happy ending to this story of achievement. It was taken down to Chengtu in a specially prepared bamboo basket, and from there it was taken by airplane to Shanghai. While there it became ill, fretful and peevish, during which time the author walked the floor with it, patted its back and cuddled it, and, finally in sheer desperation she called in a well known baby specialist, who, with clinical thermometer and stethoscope, diagnosed the trouble as a slight attack of colic and not only prescribed suitable treatment, but also worked out an adequate formula for feeding the baby. After some difficulty in obtaining permission from the Chinese government to take the panda out of the country, it was taken to America to become the only giant panda in captivity, and to be for awhile a center of

interest on the part of natural history students, and its activities to be reported with great thoroughness from time to time by the American press. The book is well written and makes delightful reading.

RECENT ADVANCES IN ENTOMOLOGY, by A. D. IMMS, 8vo., cloth, 431 pp., 94 figures, 2nd ed., P. Blakiston's Sons & Co., Phila., 1937. \$5.00 U.S. cy.

The need for a second edition of this book is regarded by the author and publishers as an indication that "The work has, on the whole, fulfilled its original purpose." In preparation of this second edition especial effort has been made to confine its scope within original limits, for the reasons that any attempt to treat such a subject at all exhaustively would require several volumes, each the size of this one, and, further, because those larger aspects of the given subject that would commend themselves for inclusion are, to a large extent, given elsewhere. In this connection, insect physiology, insects and climate, general morphology, and insects and plant viruses, for example, already have formed the subjects for recent books or monographs. Obviously, the writers of these have discussed their respective subjects far more adequately than here could be possible within the limits of single chapters. A comparison of this with the previous edition indicates that certain aspects of entomology, naturally, have required more revision than others: Under morphology, while current views on Wing Venation have undergone little change, Head Segmentation and the Genitalia have needed considerable revision. Also, recent studies of musculature have led to revision of views respecting homologies of certain of the appendages and their parts. In Metamorphosis, discoveries as to the presence of hormones are discussed, and Palaeontology has developed so rapidly as to require very full revision of the original chapter. In dealing with the Sense Organs the subject of response to visual stimuli has been extended so as to include results of a good deal of recent investigation, and a revision of the subject of Stimulatory Organs also has been included. The incorporation of new material has amplified the section on Biological Races, while Locusts and the Phase problem form a subject which has been rewritten and expanded. Extensive revision also has been given to the two chapters on Biological Control in order to bring them more nearly up to date. Minor additions and alterations also are found to be numerous. In this edition certain sections have been reprinted *in toto* or with only very slight modifications, and this has been done because the results of recent work, in the compiler's opinion, do not alter the conclusions or better exemplify the facts or phenomena previously recorded. When compared with the first edition this revision has been enlarged some 56 pages; of the illustrations some 27 are new, while 18 of the earlier figures no longer appear. It should be emphasized that this book has been prepared for the use of students and teachers rather than for the specialists within the particular fields covered. The tracing out of the many-sided recent developments of a subject of this kind, not only in the field of purely scientific research, but, also, in their more direct relation to human activities, has become a task of considerable magnitude even though this author has made no attempt to instruct the specialist in his own field. It is obvious that the physical limitations of a book of this kind must of necessity limit its scope, and this very fact has enabled at least one grateful reader to obtain a bird's eye perspective that has been highly instructive.

J. S. WADE

CONSERVATION OF THE SOIL, by A. F. GUSTAFSON, 8vo., cloth, 312 pages, 195 illus., McGraw-Hill Co., N. Y., 1937. \$3.00 U.S. cy.

There are, perhaps, few if any countries anywhere in the world any more interested than is China in the problem of soil conservation. A practical treatment of the subject, such as this, is therefore always welcome. Long recognized as a menace to agriculture, if not to the population as a

whole, it is only within the last thirty-odd years that systematic efforts have been made to obtain and make use of accurate information on soil losses and the working out of better methods for controlling these losses under varied crop conditions. The work here noticed has been prepared for use of landowners and operators, for the use of general readers, for county agricultural agents, and for use in advanced collegiate work in soil conservation. The scope of the book includes comprehensive treatment of the entire problem of soil erosion, describing methods of control that involve in the main the use of inexpensive farm materials that would be within the attainment of the individual land owner and operator. It also includes data on soil losses under varying conditions in different areas and on the relative success of control measures. Soil conservation leads to water conservation, and that, in turn, tends toward uniformity of stream flow and therefore improves conditions for fish, for navigation, and for the production of water power and for the reduction materially of the damage now resulting in many countries annually from floods. Truly, a far reaching subject, in its various ramifications! The volume is of high economic value wherever these problems are present and its study is commended.

SNAKES OF THE WORLD, by RAYMOND L. DITMARS, Imperial ed., 4to., cloth, 207 pages, 84 plates, Macmillan Company, N. Y., 1937. \$1.98 U.S. exy.

The issuance of reprints from time to time of standard reference works of this type and the continuous and wide-spread demand therefor are good criteria of their value and of their permanent excellence. In the case of the work here noticed, it is felt that the scientific fraternity owe a debt of gratitude to the publishers or whoever made possible the publication and distribution at low cost of a work of such solid merit and intensely practical usefulness. These inexpensive editions are made possible to a large degree through use of plates of original editions previously published at much higher prices, and the opportunity has been used to make necessary and desirable changes and additions where the author considered such to be needed, particularly in the use of far better illustrations than in some instances existed at the time of the publication of the original edition. Notice of the reprint edition of a companion volume to this, entitled THE REPTILES OF THE WORLD, appeared in the Lingnan Science Journal, 16(2):313-314, 1937. The nature and general scope of the contents of this latest work has become so well known through almost universal use of the previously issued editions that it does not appear feasible to give space here to detailed enumeration of contents. It will be sufficient to say that the book was first brought out in November 1931 and proved to be so popular that it was reissued in 1932, 1934, and again in 1936. In it, the author succeeded notably in a most difficult task, and has provided the general reader with a mass of highly curious and interesting data, and has presented it in a form as nontechnical as is compatible with definite and exact information. The authoritative character of the authorship of this book and its general comprehensiveness render it among the very best of the standard works available anywhere in the world at the present time on the subject. It might be added also that this particular edition under consideration, inexpensive as it is, is of the highest practical value because of its down-to-date résumé of the highly important subject of antidotes to counteract the effects of wounds from poisonous reptiles, and, in particular, the discussion of the origin, progress and present day status of anti-venom serum and its use under varying conditions. Definite, practical information of this character should always be available to all out-of-door workers in science, or others, whose duties may be such as to render likely exposure to injuries from such sources.

PLANTS USEFUL TO MAN, by WILFRED W. ROBBINS and FRANCIS RAMALEY, 2nd ed., small 8vo., cloth, 422 pages, 235 figures, bibliog., P. Blakiston's Sons and Co., Philadelphia, 1937.

It has been the purpose of the authors in bringing together the material within this volume to furnish a fairly comprehensive background of knowledge of the world's commercial plant products both for the general students of botany and for those whose special interest might be in the fields of geography, economics, or agriculture. The book includes discussion of common crop plants of orchard, garden, and field, and the more useful ornamentals such as are grown within the borders of the United States, and it also includes as well an account likewise of plants in tropical and subtropical countries which yield such materials of commerce as tea, coffee, spices, drugs, fibers, and tropical fruits. Some consideration of early work in botany in the ancient world includes a brief résumé of some of the work in China by Ching Nong about the 40th to 50th century B. C. in collection and study of medicinal roots, berries, barks and herbs and some of the decoctions, extracts, and infusions made therefrom. Somewhat similar treatment is given to the discoveries of the ancient peoples of India, of Egypt, of Babylonia and Assyria, as well as that of later students of Grecian and Roman times and still later of the period of the Middle Ages. Of especial helpfulness to scientific workers in China are the sections of the book dealing with medicinal plants and with industrial products of vegetable origin. Among the former are Poppy, Cinchona, Digitalis, Belladonna and Chaulmoogra. Among the latter are wood, wood pulp, coal, cork, fibers, straws, twigs, resins, gums, turpentine, dyes, oils, rubber and gutta percha. Still another feature of the book likely to be of genuine practical helpfulness to research workers is the very carefully selected bibliography for collateral reading and for reference purposes. The titles therein include not only some of the latest outstanding works, but also a number of the older standard works whose intrinsic value has long been conclusively established.

A HISTORY OF LAND ANIMALS IN THE WESTERN HEMISPHERE, by WILLIAM BERRYMAN SCOTT, illustrated, by R. BRUCE HORSFALL and CHARLES R. KNIGHT, rev. ed., rewritten throughout. 8vo., cloth, 786 pages, 420 figures, Macmillan, N. Y., 1937 \$7.50 U.S. ey.

This book is of value to scientists in Asia because of the excellence of its world-wide survey of the entire subject and its résumé of the work thus far accomplished and that which still remains to be done in the various countries. All those who have followed the explorations of Roy Chapman Andrews and Henry Fairfield Osborn and their associates during recent years will realize something of the immense mass of new material illustrative of mammalian evolution which resulted in the expeditions of the American Museum to Mongolia and of that institution and the Field Museum to South America. Equally important and productive have been the results of the work of the many museums of the United States and Canada in the various fossil fields of the world. Since it was quite impossible to incorporate all this new material in the former edition of this book, complete rewriting has been found necessary. A full account of all the accumulated material over many years would require a large number of volumes, therefore one of the chief problems in the preparation of this work has been that of making a proper selection of the more instructive and illuminating portions of the long and complicated story. Indeed so rapid is the course of discovery, that parts of the text became antiquated while in press and had to be rewritten. As first prepared the work proved to be far too long and it was necessary to excise several chapters, for it seemed better to cover less ground than to make the entire work appear superficial. In addition to treatment of such general subdivisions of the subject as definition and classification of animals, skeleton and teeth of mammals, fossilization of mammals and technique of palaeontology, chapters also are devoted to geological chronology, origin of the mammalia, Mesozoic mammalia, Cenozoic formations, geographic distribution, successive mammalian faunas, extinction and migrations of mammals, histories of the Proboscidea, the Artiodactyla, the Perissodactyla, the

Amblypoda, the Condylarthra, the Notoungulata, the Astrapotheria, the Pyrotheria, the Litopterna, the Carnivora, the Edentata, and the Marsupialia. It is significant that in this work it has not been found necessary to abandon any of the tentative conclusions concerning the modes and factors of mammalian evolution which were formulated many years ago, and this gives increased confidence in the validity of those conclusions.

ABSTRACTS AND REVIEWS

An attempt is made to notice, abstract, or review articles and publications dealing with the biological and physical sciences in China. Articles in these fields which do not pertain specifically to China but contain information of interest and value to scientists and others in China are also included. Although this abstract service is maintained primarily for the benefit of people in China (where scientific literature is not plentiful) it is hoped that it will also be of service to those in other countries who are interested in following the progress of science in China.

Obviously we can make mention of or abstract only such literature as comes to the attention of the editors who, accordingly, will appreciate receiving literature for this purpose. Literature thus received is placed in Lingnan University Library.

Adolph, William H. Oddities in nutrition. *Peking Nat. Hist. Bull.* 12(3) :199-212, 1938.—A lecture on the history of food fads.

Alberti, B. Revision und Neubeschreibungen asiatischer Procris-Arten. *Mitt. Munchner Ent. Ges.* 27(2) :67-101, 1 tab., 1937.—Seventeen (6 new) species and subspecies of the Lycaenid genus *Procris* are discussed. The paper is revisionary as regards the previously known species. Twelve references are given
W. E. H.

Anonymous. The animals contemporary with "Peking man." *China Jour.* 12(3) :164-166, 1930.—A list of 55 mammals, with remarks on their relation to man.
BIOLOGICAL ABSTRACTS

Anonymous. The badger. *China Jour.* 12(5) :302, 1930.—The hairs of *Meles leptorhynchus* and other Chinese species are used in the manufacture of shaving brushes, and the skins of the animals are used for rugs and clothing.
BIOLOGICAL ABSTRACTS

Anonymous. The bamboo in China. *China Jour.* 12(5) :303-304, 1930.—This is the most useful plant known to the Chinese. There are many species, one of the largest being *Phyllostachys pubescens*. Bamboo has a great variety of uses, and is exported in large quantity
BIOLOGICAL ABSTRACTS

Anonymous. Disease control work in Kwangsi Province China. *Phd. Jour. Anim. Ind.* 4(6) (sic) :483-485, 1 pl., 1937.—An account of work in rinderpest control.

Anonymous. Economics of paper. *Fortune* 6 :111-186, illus., 1937.—The subject of paper is always fascinating, whether it be approached from the point of view of economic botany, history, the productive arts or economics. Although the present article is written primarily from the point of view of economics, it contains some recent history, and much information of interest to the general reader. The average citizen of the United States is told, for instance, that he consumed, or had consumed for his benefit, in 1936, 83 pounds of paper board, 28 pounds of wrapping paper, 85 pounds of fine paper and 21 pounds of book paper. He is told that the first European settlers of what is now the United States had before them a treasure of 5 trillion board feet of timber, and that this has already dwindled to 1.5 trillion. And that in spite of the fact that the United States consumed 14,500,000 out of 24,000,000 tons produced in the world in 1936, domestic paper mills claimed but 4% of the timber cut in the United States. The United States imported, in 1936, 2,700,000 tons of newsprint (89% of which came from Canada) plus 2,300,000 tons of pulp and 1,200,000 cords of pulpwood. We import pulp chiefly from Canada, Germany, Sweden, Finland and Norway. Japan stands in seventh place as a producer of paper pulp, but occupies fifth place as consumer, and exports but little pulp. The points of chief interest to the economist stressed in the article relate to the factors that make the modern paper industry a peculiarly precarious business venture: high investment

costs per unit of output (\$40,000 per ton daily capacity, for newsprint), consequent slow turnover; long life and versatility of papermaking machinery (there are, operating in the United States today six mills that have been operating since 1860, and there are 7000 different kinds of paper, and 3000 minor variations, made in the United States today); sudden fluctuations in supply and demand in respect to pulp; etc. The illustrations are striking and informative. Besides several very unusual photographs, there is presented, for the first time, a map showing the pulp- and paper-producing capacities of the different "paper dominions of the world." To the economic botanist it may be a commonplace that "all but a fraction of the world's supply of paper comes from the softwoods; evergreens like spruce, fir, hemlock and pine," the rest coming from temperate and tropical hardwoods. But it is not generally realized that "pulp is the principal source of rayon." However, the rayon industry as yet draws but 5% of the world's pulp. The article is replete with other facts, many of which will be of interest to persons intrigued by details of techniques, or by the kaleidoscopic picture produced in industry by the constant shifting of various factors and conditions. And when one thinks of the intimate relation between paper and the spread of civilization (not to mention culture) it is evident that every educated person should know something about the drama and the complexities of its story. The reviewer recommends this article to all who read.

F. A. McCCLURE

Anonymous. The fish-breeding industry in China. *China Jour.* 12(5):308, 1930.—This great industry flourishes from Tientsin to Canton. The fish bred are all of the carp family. **BIOLOGICAL ABSTRACTS**

Anonymous. The fishing industry of the Whangpo and neighbouring creeks. *China Jour.* 12(5):307-308, 1930.—Various species which figure in this extensive industry in Kiangsu are mentioned. **BIOLOGICAL ABSTRACTS**

Anonymous. The general sketch of the Bureau of Entomology, Hangchow, China. (In Chinese and English.) *Spec. Publ. Bur. Ent. Hangchow*, No. 28, 12 p., 1935.—This is a general account of the history, organization and activities of the Bureau of Entomology, Hangchow. A table shows the losses due to damage by the more important insect pests in the Province of Chekiang in recent years. **REV. APPL. ENT.**

Anonymous. The golden weasel. *China Jour.* 12(5):302, 1930.—Over a million skins of *Mustela davidiiana* are exported annually from China to America. The tail hairs are used in making brushes. **BIOLOGICAL ABSTRACTS**

Anonymous. Goldfish breeding industry. *China Jour.* 12(5):308, 1930.—A brief sketch of this industry in China. **BIOLOGICAL ABSTRACTS**

Anonymous. Hainan Island development. *Far Eastern Rev.* 33(8):300, 1937.—A company has been formed to develop the agricultural and mineral resources of the island.

Anonymous. Partridges and quails in China. *China Jour.* 12(2):115-116, 2 pl., 1930.—Notes on the distribution, habits, and hunting of 6 spp. **BIOLOGICAL ABSTRACTS**

Anonymous. Peking man our oldest ancestor. *China Jour.* 12(1):47, 1930.—Note on the discovery near Peking of a complete skull of *Sinanthropus pekinensis*. **BIOLOGICAL ABSTRACTS**

Anonymous. The quick growing Chinese elm. *Horticulture* 16(5):102, 1938.—*Ulmus pumila* L has been imported into the U. S. A. to be used as a quick-growing temporary shade tree.

Anonymous. Sheep and goats. *China Jour.* 12(5):301, 1930.—Goats as well as sheep produce wool for use in Chinese industries.

BIOLOGICAL ABSTRACTS

[**Argiropulo, A. I.**] A new sub-species of *M. minutus* from central China. *Compt. Rend. Acad. Sci. URSS. Sér. A.* 10:253-255, 4 fig., 1929.—*M. m. zowskii.*

BIOLOGICAL ABSTRACTS

Arima, J. On the Kapok. (In Japanese with title also in English.) *Formosan Agri. Rev.*, No. 374:7-21, 5 fig., 5 tab., 1938.

Back, E. A. Cockroaches and their control. *Leaflet*, U. S. Dept. Agri., No. 144, 6 p., 5 fig., 1937.—Figures and brief biological notes are given on *Periplaneta americana* L., *P. australasiae* F., *Blatta orientalis* L., *Blatella germanica* L., and *Supella supellectilium* Serv. Control and prevention are discussed.

Bangs, Outram. The Chinese forms of *Seicercus* of the *Burkii* Form Circle. *Proc. New England Zool. Club* 11:1-5, 1929.—*Cryptolopha burkii cognita* La Touche is transferred to the genus *Seicercus* as *S. cognitus* (La Touche), and *C. intermedia* La Touche becomes *S. intermedius* (La Touche). These two species constitute one group in the genus, and four races of *S. burkii* compose a second *S. b. latouchei* in new.

C E. UNDERDOWN IN BIOLOGICAL ABSTRACTS

Bangs, Outram, and Peters, James L. Birds collected by Dr. Joseph F. Rock in western Kansu and eastern Tibet. *Bull. Mus. Comp. Zool., Harvard Coll.* 68(7):313-381, 5 pl., 1928.—This paper is based on a collection made chiefly in western Kansu (including the northern slopes of the North Kokonor Barrier and Richthofen Ranges) and eastern Tibet (including the Kokonor region and Tebuland, the latter lying south of the Minshan Range). The collection was made between April, 1925, and October, 1926. The systematic list treats of about 195 forms, with distributional and habitat records and taxonomic discussion. Ten new subspecies are described.

FROM BIOLOGICAL ABSTRACTS

Bartenef, A. N. Über die Artengruppen *Aeschna juncea* und *Aeschna clepsydra* in den Palearktischen Gebiete. *Arb. Nord-Kouasschen Assoz. Wiss. Inst.* 54:1-65, 76 fig., 1929.—A review and history of the palearctic species of the groups named. Walker's nomenclature is used. Three determinative tables are given for all palearctic form of *Aeschna*. The new variety *A. juncea mongolica* is from Mongolia.

FROM BIOLOGICAL ABSTRACTS

Bartenef, A. N. Über eine kleine Odonatensammlung aus Japan und Nordchina. *Zool. Anz.* 88(11-12):326-329, 7 fig., 1930.—*Giomphus acutus* and *G. excavatus*, n. spp., are from Japan. Two other species are listed from north China and Japan.

BIOLOGICAL ABSTRACTS

Becker, Wilhelm. Zwei neue Viola-Arten aus Sudostasien. *Rep. Spec. Nov. Reg. Teg.* 26(1-6):25-26, 1929.—*Viola nuda* n. sp. is from China.

FROM BIOLOGICAL ABSTRACTS

Beeson, C. F. C. New *Crossotarsus* (Platypodidae, Col.) *Indian For. Rec. Ent.*, 3(3):49-103, 1 pl., 1937.—In the genus *Crossotarsus* 44 new species, 4 new subspecies and 3 new sexes are described and 5 known species are recharacterised; the species occur in Ceylon, India, Burma, Indo-China, Malaya, Sumatra, Java, Borneo, Philippines, Damma, Aru, Sunbawa, Larat, New Guinea, New Hebrides and Queensland. *C. transindicus* n. sp. is described from Tongking.

AUTHOR'S ABSTRACT

Belsunce, G. de. Le soja. *Bull. Mat. Grasses* 21:171-9, 1937.—The author presents an economic study of soybean cultivation throughout the

world, based largely upon American literature and having special reference to the competition between Manchuria and the United States for the world market.

FROM HERBAGE ABSTRACTS

Bernhauer, Max. Neue Kurzflugler aus China. *Ent. Nachrichtsblatt* 3(1):2-4, 1929.—*Quedius douglasi*, *Zyras macrothorax*, and *Z. orientalis* are described.

BIOLOGICAL ABSTRACTS

Bernhauer, Max. Zur Staphyliniden-fauna des chinesischen Reiches. *Ent. Nachrichtsblatt* 3(4) 109-112, 1929.—*Astenus walkeri* n. sp. is from Haining; *Philonthus stotzneri* and *Staphylinus oculatus*, n. spp., from Szechwan; *Naddia*, key to species, with *N. chinensis* n. sp. from Kansu; *Quedius aereipennis* n. sp., near Nongpo.

BIOLOGICAL ABSTRACTS

Birkhead, Hugh. The birds of the Sage West China expedition. *Amer. Mus. Novitates*, No. 966, 17 p., 1937.—Nearly three dozen species, subspecies and forms are discussed. The new forms are: *Ithaginis cruentus annae* Mayr and Birkhead, n. subsp., (NW. Szechwan); *I. c. beicki* Mayer and Birkhead, n. subsp., (N. Kansu); *Lanius schach hainanus* n. subsp. (Hainan I.); *Urocissa erythrorhyncha caerulea* n. subsp. (NW. Yunnan).

W. E. H.

Black, Davidson. A preliminary report on the discovery of a skull of adult *Sinanthropus pekinensis* at Chou Kou Tien. *China Jour.* 12(3):163-164, 1 pl., 1930.

Boynont, Grace M. The Chinese garden. *Bull. Gard. Club Amer.*, 6 ser., No. 8:94-98, 1938.—Adaptations from notes of Hsu Ti Shan, for an address delivered at Yenching University, on the history and characteristics of the Chinese fairy-landscape garden.

Brand, A. Decas specierum novorum nona. *Rep. Spec. Nov. Reg. Veg.* 26(1-15):168-172, 1929.—Among the new species described are *Henryetana* (n. gen.) *mirabilis* and *Trigonotis giraldii* from China.

FROM BIOLOGICAL ABSTRACTS

Brehm, V. Über sudasiatische Diptomiden. *Arch. Hydrobiol.* 22 (1):140-161, map, 1 pl., 12 fig., 1930.—This report deals largely with a collection made by Handel-Mazzetti in southern China. The author discusses the systematics and distribution of the *orientalis* group (including *D. episcopus* n. sp. from Yunnan), the *mariadrigae* group, the *schmackeri* group, the *paulseni* group, and the genus *Pseudodiaptomus*.

FROM BIOLOGICAL ABSTRACTS

Bremekamp, C. E. B. The Malaysian species of the genus *Ixora* (Rub.). *Bull. Jard. Bot., Ser. 3*, 14(3-4):197-367, 1937.—A taxonomic revision of the 167 species of the region, including a key, description and locality records for each species, and an index to specific names. Many new species are described.

Breuning, Stephan. Vierter Beitrag zur Kenntnis asiatischer Caraben. *Ent. Nachrichtsblatt* 2(2):26-31, 1928.—Critical notes on the subgenus *Goniocarabus* with key to species. *C. subparallelus* ssp. *turkestanus* is described from Turkestan.

FROM BIOLOGICAL ABSTRACTS

Bruel, W.-E. Van den. Le crabe chinois en Belgique. *Ann. Gembloux* 44(1):28, 1938.—*Eriorchir sinensis* H. Milne-Edwards is reported from Belgium.

Bryk, Felix, and Eisner, Curt. *Parn. funkei* O. B. H. ♀ forma *interrupta* (nobis). *Internat. Ent. Zeitschi.* 23(4):56, 1929.—*Parnassius f. form interrupta* from Szechwan.

BIOLOGICAL ABSTRACTS

Bryk, Felix, and Eisner, Curt. *Parn. stubbendorfi* Elwes subspecies *diabolicus* (n.). *Societas Ent.* 44(12) :47-48, 4 fig., 1929.—From China, type in Eisner collection.

BIOLOGICAL ABSTRACTS

Buddle, R. Entomological notes on the Canton delta. *Jour Royal Naval Med. Service* 14(3) :190-200, 1928.—A report on the distribution of mosquitoes in this area and on board British warships in the delta region. The culicines and the anophelines are abundantly represented, including the carriers of malaria and of yellow fever. Habits and breeding places are described, and associated organisms, as crustaceans, spiders, etc., are mentioned.

A. SCHNEIDER in BIOLOGICAL ABSTRACTS

Bureau of Entomology of Chekiang Province. A corrected list on the series and number of the previous publications before 1934 of the Bureau of Entomology, Hangchow. (In Chinese with title also in English.) *Bur. of Ent., Chekiang, Misc. Spec. Bull.* No. 26 :281-295, 1933. [Received May 1934.]—There are seven different kinds of publications, namely, Year Books, Entomology & Phytopathology, Technical Bulletins, Special Bulletins, Circulars, Pictorial Sheets, and Miscellaneous Publications. The title of each kind of publication is given with the date of issue, original number, and price.

H. W. TSANG

Bureau of Entomology of Chekiang Province. Laws and regulations on controlling insect pests and plant diseases in Chekiang. (In Chinese with title also in English.) *Bur. of Ent., Chekiang, Spec. Bull.* No. 26 :252-280, 1933. [Received May 1934.]

Bureau of Entomology of Chekiang Province. Replies on the questions relating to insect pests and plant diseases (II). (In Chinese with title also in English.) *Bur. of Ent., Chekiang, Spec. Bull.* No. 25 :225-250, 1933 [Received May 1934].—Certain parts of various letters asking for information with special reference to the methods of control of insect pests and plant diseases, and the replies on these questions are given. Among 27 cases discussed, only 6 cases are related to plant diseases.

Y. C. NG

Bureau of Entomology of Chekiang Province. A survey on the damage caused by *Pectinophora gossypiella* in Chekiang in 1932. (In Chinese with title also in English.) *Bur. of Ent., Chekiang, Spec. Bull.* No. 24 :219-224, 4 tab., 1 map, 1933. [Received May 1934].—It was found that the epidemic area involved thirteen hsien; Shang-ye (上虞) and Hai-yen (海鹽) have the highest percentage of damage. The total loss due to this insect amounted to five million dollars in 1932. The death rate of the overwintering caterpillars is quite high and the other potential source of this insect pest is the cotton bolls.

H. W. TSANG

Burret, M. Palmae chinenses. *Notizblatt Bot. Gart. Mus. Berlin-Dahlem* 13(120) :582-606, 1937.—Thirty-four species, 11 of them new, are reported. One species is from Hong Kong, 10 are from Kwangtung Province, 20 from Hainan Island, 1 from Szechwan, 11 from Kwangsi, 1 from Kwei-chow, and 2 from S. China. The new genus *Chuniophoenix*, based on *C. hainanensis*, is described.

Caldwell, Harry R. Notes on the dead-leaf butterfly, *Kallima*, and a new species of *Papilio*. *China Jour.* 12(6) :355-357, 1 pl., 1930.—Actual mimicry in *Kallima sinensis* is considered uncommon. *Papilio aphrodite* n. sp. is from Fukien.

BIOLOGICAL ABSTRACTS

Camus, Aimée. Espèces asiatiques nouvelles du genre *Carpinus*. *Bull. Soc. Bot. France* 76(9-10) :966-969, 6 fig., 1929.—*Carpinus rupestris* n. sp. is from "Kouy-tcheou," China; *C. poilanei* and var. *chevalieri* from Annam.

BIOLOGICAL ABSTRACTS

Camus, Aimée. Fagacées nouvelles de l'Asie orientale. *Not. Syst.* 6(4) : 178-185, 1938.—*Castanopsis argyraantha* n. sp., *Lithocarpus Tsangii* n. sp., and *L. uncinata* n. sp. are described from Kwangsi. Six new species are from Indo-China. *L. caudatilimba* is reported from Hainan I.

Caradja, Aristide. Ueber Chinas Pyraliden, Tortriciden, Tineiden nebst kurze Betrachtungen, zu deren das Studium dieser Fauna Veranlassung gibt. *Acad. Romana Sect. Stint. Ser. 3*, 3 : 257-387, 2 pl., 1926.—An extensive biogeographical sketch covering India and the East Indies, as well as China, with an annotated list containing 726 forms, 325 of which are new to China, 206 apparently endemic, and 91 new to science. Types apparently in author's collection.

FROM BIOLOGICAL ABSTRACTS

Chakravarty, H. L. Physiological anatomy of the leaves of Cucurbitaceae. *Phil. Jour. Sci.* 63(4) : 409-431, 2 tab., 11 pl., 1937.—A dozen species of cultivated cucurbits (many of which are cosmopolitan) were studied. It was determined that an anatomical knowledge of the leaf in this family made it possible to trace the evolutionary relationship of genera. The nature, number, and arrangement of the vascular bundles in the midribs and petioles of the leaves maintain an individuality of character in a particular genus or even in a species, thus greatly facilitating the identification of the genus from a knowledge of the anatomy of the midrib and the petiole. Thirty seven references are given.

W. E. H.

Chang, Chao-chien, 張肇堅 Contributions to the knowledge of Chinese Compositae. (In English with Chinese abstract) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(4) : 153-164, 1936.—The following are treated: *Senecio Humberti* n. sp., from Yunnan; *S. sinicus* (Diels) Chang, new combination for *Gynura sinica* Diels; *S. curvisquamus* (Hand.-Mazz.) Chang, new combination for *Ligularia curvisquamata* Hand.-Mazz.; *S. c. var. robustus* n. var., from Yunnan; *S. Hui* n. sp., from Kouy-tehou; *S. moupinensis* (Franch.) Chang, new combination for *S. quinquelobus* Hook. f. et Thoms. var. *moupinensis* Franch.; *Artemisia haichowensis* n. sp., from Haichow; *Chrysanthemum parvifolium* n. sp., from Kweichow; *Cirsium Chuenii* n. sp., from Szechwan; *C. fusco-trichum* n. sp., from Szechwan, *Aster Sumpsonii* (Hence) Hemsl. var. *isochaetus* n. var., from Yuyuen.

Chang, Ming-chun. The anatomy of the fresh water viviparous snails. *Peking Soc. Nat. Hist. Bull.* 3(4) : 45-57, 2 pl., 1929.—The specimens were collected on the Yenching Univ. campus. The ♂ is slightly smaller than the ♀. The external shell and the internal organs are in the form of a cone of 6 dexter coils. The peristome is closed by an operculum. Snout, pair of tentacles, and eyes are on anterior of leaf-like sole. In the ♂ the right tentacle is modified for copulation. Six internal systems, viz., digestive, respiratory, circulatory, nervous, reproductive, and excretory, are located in 3 cavities, viz., pericardial, body, and mantle of which the mantle cavity is the largest. In anterior body cavity are contained esophagus, pharynx, and salivary glands. The canal and glands of the digestive system are twisted into a "U" in the visceral dome. The respiratory system consists of mantle, siphon, and stenidium. The heart is situated in the pericardium, which is filled with a colorless fluid. Two large arteries arise from the ventricle. The nervous system is composed of 2 cerebro-visceral connectives which twist and cross to form a figure 8, and 6 ganglia. The ♀ carries embryos in all stages in all seasons. A single kidney and a large urinary duct make up the excretory organs.

M.-C. CHANG in BIOLOGICAL ABSTRACTS

Chao, Yatseng T. Carboniferous and Permian Spiriferids of China. *Geol. Surv. China Palaeontol. Sinico* 11B(1) : 5-93, 11 pl., 20 fig., 1929.—The genus *Spirifer* was founded by Sowerby with *Anomites striatus* Martin as the type. The generic description was very wide, all the plicated

spiriferoid shells being referred to this genus. In recent years, a great limitation of the diagnosis of *Spirifer* has been deemed necessary and the genus is here used to include only those forms which possess both an external spiriferoid configuration, and internal structures of the type of *Spirifer striatus*. These consist in the presence, within the pedicle valve, of 2 short diverging apical plates separated in the middle by a low median ridge of *Spirifer*. These plates are not adjacent on the floor of the pedicle valve but are widely apart, extending only a short distance with rapidly decreasing strength beyond the lower limit of the area. The shell is generally considerably thickened in the apical part, resulting in the formation of a solid sinuous mass with the apical plates shown only by faint dark lines on polished surface. Beyond this thickened platform, the shell descends abruptly to an oval depression left by the muscular scars with a low ridge at the middle. Forms belonging to this genus undergo a distinct modification toward the development of bundling of plications. In the Lower Carboniferous species bundling of phaeae is generally not well expressed, but toward the higher Carboniferous and Permian formations there is further developed a group of forms with the phaeae compounded in pronounced bundles. For this fasciculate type, Fredericks proposed more recently the name *Neospirifer* with *Spirifer fasciger* Keyserling as the genotype. It is to be noted, however, that the development of the fasciculate form from the non-fasciculate type is not a sharp but a gradual one and both types seem to intergrade into each other. Thus, the British *Spirifer attenuatus* Sowerby and the Kansu *S. lungchowensis* are very nearly related to *S. striatus*, but show a distinct though not pronounced fasciculation of the phaeae in the early stages. Because of the intergrading character in the bundling of phaeae, the author prefers at present to place both the fasciculate and the non-fasciculate types under the generic designation *Spirifer*. Descriptions, measurements of species and synonymy are included in addition to the very numerous illustrations.

FROM BIOLOGICAL ABSTRACTS

Chao, Yatseng T. Fauna of the Taiyuan formation of North China, Pelecypoda. *Geol. Surv. China Palaeontol. Sinica B* 9(3) :1-64, 4 pl., 1927.—There are descriptions of 23 new species and of the new genera *Cucullopus* and *Palaeolucina*. Critical notes are also given on 7 old species from this Carboniferous formation.

FROM BIOLOGICAL ABSTRACTS

Chasen, F. N. The birds of Billiton Island. *Treubia* 16(2) :205-238, 1937.—The collection of Mr F. J. Kuiper, made in 1935-7, is described. This collection adds 70 species to the list of birds from this island in the Java Sea, making a total of 167. Three of these birds show affinities with those of the China Sea Islands.

Chen, Shih-ti. Chromosome studies in *Haplotropis brunneriana* Saussure (Order Orthoptera). *Peking Nat. Hist. Bull.* 12(2) :79-94, 2 pl., 1937.—A study was made of the behavior of individually recognizable chromosomes in this species of Acrididae.

Chen, Y. J. Some cotton problems in China. *Proc. Assoc. Econ. Biol.* 4 :78, 1937.—Trade depression, droughts, insect pests, and requirement of land for food make it impossible for China to be self-supporting in cotton production.

Chevey, P. Capture d'un Requin-Baleine, *Rhineodon typus* A. Smith, en Cochinchine. Résumé de nos connaissances sur ce Poisson. *Notes*, No. 28, Inst. Océanog. l'Indochine, 31 p. 9 pl., 1936.—There is a review of the history, taxonomy, morphology, biology and distribution of *R. typus*. A bibliography of 85 references is given.

Chevey, P. Le grand lac de Cambodge. Les causes profondes de sa richesse ichthyologique. *Notes*, Inst. Océanog. l'Indochine, No. 29 :

39-49, 1 fig., 1 map, 1 tab., 1936.—The fauna of the Great Lake of Cambodia is very rich in both numbers of species and individuals of fishes, producing a yield of 100,000 tons of fish a year. It was found that fish in the lake grow much faster than elsewhere in Cambodia, probably due to the fact that the lake annually floods the neighboring forest.

Chevey, P. La méthode de "Lecture des écailles" et les poissons de la zone intertropicale. *Notes, Inst. Oceanog. l'Indochine*, No. 29: 51-65, 5 pl., 5 fig., 1 tab., 1936.—Examination of variation of the markings of fish scales permit the establishment of 3 thermometric zones, the Gulf of Siam, the coasts of Cochinchina and south Annam, the coasts of central and north Annam and the Gulf of Tonkin.

Chevey, P. Rapport sur le fonctionnement de l'Institut Océanographique de l'Indochine pendant l'année 1934-1935. *Notes, Inst. Océanog. l'Indochine*, No. 27: 1-26, 19 pl., 1935.

Chevey, P. Résumé des travaux de l'Institut Océanographique de l'Indochine pendant la période 1929-1933. *Notes, Inst. Océanog. l'Indochine*, No. 29: 9-13, 1936.—A brief review of work done on physical and biological oceanography, and on fish industries.

Chevey, P., and Lemasson, J. Contribution à l'étude poissons des eaux douces tonkmorises. *Notes*, No. 33, Inst. Océanog. l'Indochine, 183 p., 44 pl., 2 fig., 2 maps, 3 tab., 1937.—One hundred species, representing 69 genera in 17 families, are treated. Many of the species are also recorded from China. Synonymy, systematic diagnosis, vernacular name, biology and distribution, and utilization are given for each species. There are indexes to generic and specific names and vernacular names. In the bibliography 156 titles are listed. An appendix of 11 pages discusses pisciculture in Tonkin.

Chin, Yin-chang, Liu, Cheng-chao, and Li, Ju-chi, 金陞昌, 劉承釗, 李汝祺. Melanophoral changes in the wall lizard, *Gekko swinhonis*. *Peking Nat. Hist. Bull.* 12(3): 183-198, 11 tab., 1938.—We have demonstrated that with the wall lizard, *G. swinhonis*, moisture affected the color change of the animal so intensely that it even masked the effect of light and color of the back-ground against which the lizards were placed. This response must be considered as an adaptation to the peculiar environment in which the animals find themselves. We have further demonstrated that there is no specialized sense organ acting as a moisture receptor of the animal and that the whole skin surface may serve the purpose of receiving the moisture stimulus. It can do so either when it comes in contact with moisture or is otherwise exposed to it. Hogben and Mirvish showed that in the African chameleon there is a chromatic center in the brain which keeps the melanophores in the state of contraction, except when released by external stimuli, but they denied the action of pituitrin on melanophores. We have found that the fully expanded condition of the melanophores after the injection of pituitrin persisted for half a day when the animal was put into a dry and bright environment. The response to the injection was so quick that within 2-5 minutes the melanophores changed to a maximum degree. The nerves may take part in melanophoral changes, as expansion was induced by anaesthetics and contraction by stimulating the nerves of the tongue with electricity.

FROM AUTHORS' DISCUSSION AND SUMMARY

Cho, Y. On the koa-sugar cane. (In Japanese with title also in English.) *Formosan Agric. Rev.* 376: 207-220, 1938

Chow, C. H., 周宗璣. Notes on Myxomycetes from North China. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(6): 257-280, 1937.—Specimens were collected during 3 years, chiefly in the southern Chahar, a few from the Eastern Tombs and the environs of Peiping. They

belong to 17 genera of which *Leocarpus*, *Lindbladia* and *Enteridium* are reported here for the first time in China. Among the species and varieties are 15 new Chinese records. Taxonomic and distribution notes are given on 33 species.

Chow, C. H., 周宗彥. Notes on *Sinolloodia*, a nomenclatural change to the fungus genus *Lloydia*. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(4) :165-167, 1936.—*Sinolloodia* is proposed to replace *Lloydia* Chow, the name being preoccupied in Liliaceae. *Sinolloodia quadrangularis* n. combination, is distinguished from *Lysurus Mokusin* and other species of *Lysurus*.

Christensen, C. The genus *Cyrtomium*. *Amer. Fern Jour.* 20 (2) : 41-52, 1930.—A synopsis, with key and critical notes, of the 9 species recognized. *C. caryotideum* v. *aequibasis* is from China.

FROM BIOLOGICAL ABSTRACTS

Christensen, Carl, and Tardieu-Blott, Mme. Les fougères d'Indochine. XI. Pteridac. *Not. Syst.* 6(3) :135-149, 1 pl., 1937.—Thirty-three species, including two new species of *Pteris*, are treated. *Pteris ensiformis* Burm., *P. linearis* Poir., *P. multifida* Poir., and *P. semipinnata* C. are recorded from Hainan Island.

Chu, Yuanting T. A new species of the swallow ray (Pteroplatea) from China. *China Jour.* 12(6) :357, 1 pl., 1930.—*Pteroplatea jordani* from the East China Sea.

BIOLOGICAL ABSTRACTS

Chujō, Michio. H. Sauter's Formosa collection: subfamily Eumolpinae. (Coleoptera Chrysomelidae II). *Arb. morph tax. Ent. Berlin-Dahlem* 5(1) :25-36, 1938.—Twenty-six species and subspecies, including 14 new ones, are described. A number of the species are widely distributed and 7 of them are listed as occurring also in China. W. E. H.

Colbert, Edwin H. Tertiary deer discovered by the American Museum Asiatic expeditions. *Amer. Mus. Novitates*, No. 854, 21 p., 10 fig., 1936.—The following are described: *Stephanoceras thomsoni*, n. gen. & sp., *S. triacuminatus* n. sp., *Dicrocerus grangeri* n. sp., *Dicrocerus* sp. All the new species from Inner Mongolia and all are figured. W. E. H.

Colbert, Edwin H. *Palaeotragus* in the Tung Gur formation of Mongolia. *Amer. Mus. Novitates*, No. 874, 17 p., 7 fig., 1936.—*Palaeotragus turgurensis* n. sp. is described from Inner Mongolia and is figured. The species is compared with *P. coelophrys* (Rodler and Weithofer) of N. China. Variations in the new species are discussed, measurements are given in detail and comparisons are made with other members of the same subfamily. There are 21 references. W. E. H.

Croizat, Leon. *Acer japonicum* var. *Parsonii* Hort. [Veitch & Sons] ex Schwerin, an invalid trinomial. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* : 197-200, 1936.—Meechau's name 4th j. var. *acouatifolium* is the earlier name of this variety.

Croizat, Leon. A misinterpreted Formosan species, *Euphorbia calonesuaca*, spec. nov. *Jour. Arn. Arb.* 19(1) :97-98, 1938.—*E. calonesuaca* is made a new name for *E. orientalis* Hayata, non L.

Crook, A. H. The white ant once more. *Hong Kong Nat.* 8(3-4) : 186-188, 1938.—A review of the book "The Soul of the White Ant" by Eugene N. Marais, Methuen & Co., Ltd., London.

Crosby, C. R., and Crosby, Nellie H. A new seed-infesting chalcid-fly from China. *Jour. New York Ent. Soc.* 37(1) :13-14, 1 pl., 1929.—*Bruchophagus sophorae* n. sp. from Peking, was reared from the seeds of *Sophora japonica*.

BIOLOGICAL ABSTRACTS

Dadswell, H. E. Recent developments in the photographic copying of published articles. *Jour. Coun. Sci. Ind. Res.* 10(3) :187-192, 2 fig., 1937.—Methods of photographic copying, especially as developed in the U.S.A., are reviewed. There is also an account of the method being used by the author who uses an ordinary Leica camera with certain attachments and special lighting. Figures are given on the cost of operation. W. E. H.

Deasy, George F. The future of Manchurian agriculture. *Jour. Geogr.* 37(1) :20-27, 2 fig., 1938.—The author concludes that the agriculture of the country will have a great future, since there is a wealth of natural resources being developed by an industrious people. However, since the bulk of the immigrants to Manchuria are tradition bound, impoverished Chinese peasants, he does not expect the country to advance to a superior culture, but only to expand economically.

Delacour, J. Note sur la collection de l'Université Sun-Yatsen, à Canton, avec description d'oiseaux nouveaux. *Rev. Hist. Nat. Pt. 2 Oiseau et Rev. Française Ornithol.* 11(6) . 337-339, 1930.—*Arborophila ricketti sini* and *Cissa concular jini*, new subspecies, are described. Types are in the collection of the University. *Oriolus mellianus* is described.

BIOLOGICAL ABSTRACTS

Dice, Lee R. The phylogeny of the Leporidae, with description of a new genus. *Jour. Mammalogy* 10(4) :340-344, 1 fig., 1929.—The family is divided into Palaeolaginae, n. n. for Palaeolagida, Archaeolaginae n. subfam., and Leporinae n. subfam. The new genus *Illolagus* is based on *Depus unnectens* Schlosser from the Pliocene of Mongolia.

L. R. DICE in BIOLOGICAL ABSTRACTS

Dietrich, W. O. Fortschritte der Saugertypalaeontologie. Die Entdeckungen der Amerikaner in der Mongolei. *Sitzungsber. Ges. Naturforsch. Freunde Berlin* 1928 (1-3) :45-79, 3 fig., 1928.—Discussion of results of Asiatic Expeditions of the American Mus. Natural Hist. in so far as they concern fossil mammals.

BIOLOGICAL ABSTRACTS

Doi, Kyusaku. On five species of Chrysomelidae from Koshuei, southern Manchuria. *Dobutsugaku Zasshi* 39(468) :349-399, 1927.

Doi, Kyusaku. Studies on Chrysomelidae in Korea. *Dobutsugaku Zasshi* 39(466) :323-339, 1 map, 1 fig., 1927—Habits of 23 species in Korea and their world-wide distribution.

T. GODA (COURTESY JAP. JOUR. ZOOL.) in BIOLOGICAL ABSTRACTS

Dollman, J. Guy. A young Chinese tiger. *Nat. Hist. Mag. [London]* 2(11) :81-82, 1 fig., 1929.—A mounted specimen is figured, and there are remarks on the distribution and characters of the various races of *Felis tigris*.

BIOLOGICAL ABSTRACTS

Dop, Paul. Les Vitex de l'Indochine. *Bull. Soc. Hist. Nat. Toulouse* 57(2) :197-211, 3 pl., 1928.—Eight new species and one new variety are described in the group Terminales. *Vitex duclouxii* of the Axillares group is from China. There is an enumeration, with notes, of 20 known species from Indo-China. Four species furnish valuable wood. Notes on geographical distribution are included.

FROM BIOLOGICAL ABSTRACTS

Efimov, A. Ed. List of insect pests in Japan, Chosen (Korea) and Taiwan (Formosa) (which have or may receive quarantine importance in U. S. S. R.). (In Russian.) Demi 8vo, 54 p., *Centr. Lab. Quar. Administr.*, Moscow, 1936.—This is the first of a proposed series of lists of pests and diseases of plants that occur in various countries and are liable to be imported into the Russian Union. It deals with over 400 species of injurious insects found in Japan, Korea and Formosa. It includes a list

arranged in tabular form showing the principal pests under their food-plants, which are given in alphabetical order, the part attacked, the distribution of the pests in Japan, Korea and Formosa, and their occurrence in, or absence from, the Russian Union. This is followed by a systematic list of pests that are of special quarantine importance for the Russian Union, and by an additional list of 166 species of injurious insects of minor importance observed in Japan and not included in the first list; the food-plants are shown in each case. An index to the pests is appended.

FROM REV. APPL. ENT.

[**Emel'ianov, A. A.**] [Snakes of the Far East.] (In Russian with English summary.) *Mem. Vladivostok Sect. Russian State Geograph. Soc.* 3(1) :1-208, 2 maps, 10 pl., 46 fig., 1929.—This report represents work during 20 years on the snakes of eastern Siberia and a part of northern Manchuria. About 15 spp. occur, including the following that may be dangerous: 3 forms of *Ancistrodon*, 2 of *Crotalus*, and *Hydrus platurus*. The literature is briefly reviewed. The systematic account includes synonomies, figures, and remarks on ecology and distribution.

FROM BIOLOGICAL ABSTRACTS

Enderlein, Gunther. *Acalyptrata aus Mandschukuo* (Dipt.). *Mitteil. Deut. Ent. Gesell.* 8(4) :71-75, 1937.—*Seoptera vibrans* (L.) is reported and the following new species are described from Charbin: *Platystoma mandschurica*, *Rivellia alini*, *R. charbinensis*, *Noetomima* (n. gen.) *radiata*, and *Homoneura signata*.

Fan Memorial Institute of Biology. Sixth Annual Report for the year 1934; Seventh Annual Report for the year 1935. Published by the Institute, 4 pl., 1935 and 1936.—These reports cover research, field work, publications, accessions to the zoological museum, herbarium, and library. Reports are included on the works of the Lu-shan Arboretum and Botanical Garden.

Fedde, Friedrich. *Corydalis hamata* Franch. et *C. pseudohamata* Fedde. *Rep. Spec. Nor. Reg. Veg.* 24(14-21) :239-241, 1928.—*C. pseudohamata* is made a synonym of *C. hamata*. *C. binderae* n. sp. is from Szechwan.

BIOLOGICAL ABSTRACTS

Fedde, F. Neue Arten von *Corydalis* aus China. XIII XIV. XV. XVI. *Rep. Spec. Nor. Reg. Veg.* 24 :241, 1928; 25 :220-224, 1928; 26 :174-176, 272, 1929.—Notes are given on synonymy, distribution and floral coloration. The new groups *Mucronatae* and *Benecinctae* are created. *C. trilobipetala* and *C. chelidonium* are new species; *C. delavayi stenophylla* and *C. d. euryphylla*, n. varieties.

FROM BIOLOGICAL ABSTRACTS

Filipenko, F. S. The bamboos of the Black Sea Coast of the U. S. S. R. *Bull. Intro. Gard. Subtrop. Cult.* No 1, 73 p., illus., 1937.—A publication in Russian with a summary in English. In addition to a brief summary of work published by various workers on the chemical composition and chromosome numbers of various bamboos, a survey is presented covering the activities of the U. S. S. R. in the introduction and acclimatization of bamboos, particularly in the Black Sea Coast region. Twenty five species and 14 varieties representing 9 genera, chiefly of Chinese and Japanese origin, have been introduced. A systematic enumeration of these, with descriptions and keys, is included. The authenticity of the nomenclature used is open to serious question, in some instances, however. Mention is made of the flowering of *Phyllostachys puberula* var. *nigra* H. de L. (sic) (1932) and *Ph. aurea* Carr. (1934) and these species are said to be dying out. The introductions belong chiefly to the group with vernal innovation of shoots which are indicated as quite frost resistant, while those with autumnal innovation of shoots (*Bambusa* and *Chimonobambusa*) are not. Nearly all of the eight species and nine varieties of *Phyllostachys* are considered to be of commercial

value. The commercial cultivation of bamboos on the coast is centered chiefly in Adjaristan and to a minor extent in Abkasia (Sukumi), while collections are maintained throughout the Black Sea Coast area from Crimea to Batoumi, in the West Georgia and at the Botanical Garden at Tbilissi. "All the Black Sea Coast, from Batoumi to Tuapse, many districts of the West Georgia and southern part of the West Caspian Sea Coast (Lencoran) are quite suitable for the commercial cultivation of bamboos." Experiments indicate also that the areas devoted to the commercial cultivation of bamboo may be extended considerably inland to the coastal hills. The desirability of making further introductions from China, Japan, India (Himalayan region), Chili and elsewhere is indicated.

F. A. McCCLURE

Flerov, C. Preliminary note on the diagnostic characters of the genus *Moschus* Linne (Mammalia, Cervidae). *Compt. Rend. Acad. Sci. URSS.*, Sér. 1928 (24) :515-519, 1928.—This revisional account of the genus, based on material in the Zool. Mus., Russian Acad. Sci., contains descriptions, with notes on distribution and type locality, of 8 species or subspecies, including *Moschus berezovskii* n. sp. from China.

FROM BIOLOGICAL ABSTRACTS

Fowler, Henry W. A synopsis of the fishes of China. Part VII (continued). The perch like fishes. *Hong Kong Nat.* 8(3-4) :249-289, 17 fig., 1938.—This instalment of the series on Chinese fishes treats the family Serranidae, the Sea Bass. The doubtful species *Odontolabrax typus* Bleeker is described. A synopsis is given of 12 genera of the family. Descriptions and distribution notes are given for each species. They are *Lates* Cuvier, *Psammoperca* Richardson, *Diploprion* Cuvier, *Malakichthys* Steind. & Doderl., *Lateolabrax* Bleeker, *Niphon* Cuvier, (with one species each), *Pikea* Steind. (2 spp.), *Plectropomus* Oken (1 sp.), *Cephalopholis* Schneider (4 spp.), *Serranus* Cuvier (23 spp.), *Trisopteris* Gill (1 sp.), and *Cromileptes* Swainson (1 sp.).

Frey, Richard. Über orientalische *Leptogaster*-Arten (Dipt., Asilidae). *Notulae Ent.* 17(2) :38-52, 1937.—Keys are given to the oriental subgenera and species of *Leptogaster*. About 20 species are discussed, a number of which are new. *L. (Lagynogaster) Suensonii* n. sp. is described from Yenping, Fukien. W. E. II.

Fu, T. S., 傅桐生. The squirrels of Sung-Shan. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 6(6) :255-264, 1936.—Redescription, with notes on range and habitat, is given for each of the 6 species found: *Eutamias asiaticus senencens* Miller, *E. a. intercessor* Thomas, *Tamias macclellandi vestitus* Miller, *Sciurotamias davidianus davidianus* (Milne Edwards), *Sciurus vulgaris chiliensis* Sowerby, *Sciuropterous buscherti* Satunini.

Fukuzaki, T. On the contain of vitamine C in dried vegetables. (In Japanese with title also in English.) *Formosan Agri. Rev.*, No. 374 .22-27, 3 tab., 1938.

Fulton, H. C. Descriptions of new species of *Fusinus*, *Biplex*, *Trochus*, and *Bushia*. *Proc. Malac. Soc. London* 19(1) :16-17, 2 pl., 1930.—*Bursa microstoma* n. sp. is from China. FROM BIOLOGICAL ABSTRACTS

Fyfe, R. V. The Lantana Bug, *Teleonemia lantanae* Distant. *Jour. Coun. Sci. Ind. Res.* 10(3) :181-186, 4 pl., 1937.—This bug has been introduced from Mexico to Hawaii and thence to Fiji and now to Australia. The purpose of the introduction was to use it in combatting the noxious shrub *Lantana camara*. The success of this venture is of interest to south China where attempts have already been made to introduce insect enemies of *L. camara* and other species of *Lantana*. Fortunately this lace bug feeds only

on the genus *Lantana*. The life history notes here given are based on studies made in Fuji. The eggs hatch in about a week and the nymphal development (5 instars) is completed in from 12 to 18 days depending upon the temperature. The preoviposition period of 5 or 6 days and the adults may live as long as three months.

W. E. H.

Gagnepain, F. Un *Centralepis* nouveau d'Indochine. *Not. Syst.* 6(4):177-178, 1938.—*C. miborooides* n. sp. is from Tonkin.

Gagnepain, F. Deux Dillénincées nouvelles d'Indochine. *Not. Syst.* 6(1):39-40, 1937.—*Dillenia Harmandii* n. sp. is described from Laos, *Tetracera kampotensis* n. sp. from Cambodia.

Gagnepain, F. Palmiers d'Indochine nouveaux ou Litigieux. *Not. Syst.* 6(3):149-160, 1937.—Twelve new species and one new combination are treated.

Gagnepain, F. *Pandanus* nouveaux d'Indochine. *Not. Syst.* 6(4):176-177, 1938.—*P. leucocephalus* and *P. fibrosus*, n. spp. are described from Annam.

Galliard, H. Distribution géographique de *Filaria malayi* et de *Filaria bancrofti* au Tonkin. *Bull. Soc. Path. Exot.* 30(7):573-577, 1937.—*Filaria malayi* is common in the blood of inhabitants of Tonkin, 62 cases, i. e. 4.5%, occurring in 1,363 persons, whereas *F. bancrofti* only occurred in 37, i. e. 2.71%. Infection with *F. malayi* in the delta of the Red River is also very frequent, but it is almost non-existent around Hanoi.

R. T. L. in HELMINTH. ABST. FOR 1937

Galliard, H. *Onchocerca ceber*, espèce nouvelle, parasite des buffles du Tonkin. *Ann. Parasitol. Hum. Comp.* 15(5):431-433, 1937.—Galliard describes a new species of *Onchocerca* from subcutaneous tumours in buffalos in Tonkin. At the Hanoi abattoirs 20% to 50% of the buffalos were infected. The new species differs from *O. gibsoni* and *O. indica* in the dimensions of its longer spicule (330 to 360 μ long) and in the relative dimensions of its two spicules.

J. J. C. B. in HELMINTH. ABST. FOR 1937

Gee, N. Gist. A contribution toward a preliminary list of reptiles recorded from China. *Peking Soc. Nat. Hist. Bull.* 4(2):53-84, 1929.—This list of reptiles, compiled from all available sources, is intended by the author to be the starting point for further and more complete studies on Chinese reptiles. For each form the place of original publication and the general distribution are given.

BIOLOGICAL ABSTRACTS

Gee, N. Gist. Some further notes on the elm moth. *Peking Soc. Nat. Hist. Bull.* 4(2):9-10, 1929.—In 1928, most elm trees of Peking were defoliated by caterpillars (*Euzoia* sp.). By Sept. 10 the moths emerged in great numbers. The caterpillars were parasitized by two Diptera (*Sarcophaga securifera* Vill. and *S. dux* Thoms.) and by 3 Hymenoptera (doubtless Chalcidae). No caterpillars appeared in 1929. Control through parasites is considered more practical than spraying.

BIOLOGICAL ABSTRACTS

Georgi, C. D. V. Further selection experiments with *Derris malaccensis*. *Malayan Agri. Jour.* 26(1):4-17, 12 tab., 1938.—Three varieties of *Derris malaccensis* were tested. *D. m.* var. *sarawakensis* was superior to the other two varieties. Not any of the varieties were good enough to be marketed on a rotenone basis—must be sold on an ether extract basis.

Gillet, Joseph J. E. Descriptions de Lamellicornes Coprophages nouveaux. *Bull. & Ann. Soc. Ent. Belgique* 67(9-10):251-261, 1927.—*Onthophagus acuticollis* and *O. argyropygus* n. spp. are reported from Formosa.

FROM BIOLOGICAL ABSTRACTS

Goidanich, Athos. Osservazioni sopra il genere *Onthophagus* Latr. XI-XIII. *Boll. Soc. Adriatica Sci. Nat.* 29:129-138, 9 fig., 1926-27.—Among other species discussed, *Onthophagus solvagus* f. *confucius*, is described from Fu chau and *O. lenzi* f. *basicruentatus* from Fo-kien.

FROM BIOLOGICAL ABSTRACTS

Grabau, A. W. Nathaniel Gist Gee (April 20, 1876—Dec. 18, 1937). *Peking Nat. Hist. Bull.* 12(3):167-168, portrait, 1938.—A biography.

Granger, Walter, and Gregory, William K. A revised restoration of the skeleton of *Baluchitherium*, gigantic fossil rhinoceros of central Asia. *Amer. Mus. Novitates*, No. 787, 1 p., 2 fig., 1935.—On the basis of recently secured material the restoration of the skeleton of *Baluchitherium* has been revised yet another time. The present restoration represents an animal 17 feet, 3 inches in height at the shoulder, thus exceeding by far the tallest land mammal hitherto known. The skull is relatively small. The present restoration indicates that this animal is quite similar to one of the primitive hornless Oligocene rhinoceroses. W. E. H.

Gravier, Ch., and Dantan, J. L. Pêches nocturnes à la lumière artificielle sur les côtes de l'Indochine. Annélides polychaetes. *Notes, Inst. Océanog. l'Indochine*, No. 29:67-71, 1936.—Methods of obtaining annelids by artificial light are explained. The fauna of Indochina was found to be less rich than that of Algeria. Identification of forms present many difficulties.

Green, E. Ernest. An annotated list of the Coccidae of Ceylon, with emendations and additions to date. *Spolia Zeylanica* 20(3):277-341, 1937.—Three hundred and twenty-seven species are recorded. Foodplants in Ceylon and distribution are indicated as is also the original citation. Only such synonymy as is needed to indicate the correct nomenclature is given. A number of the species are also found in China. W. E. H.

Gressitt, J. Linsley. A new snake from southeastern China. *Proc. Biol. Soc. Washington* 50:125-128, 1937.—*Natrix boulengeri* n. sp. is described from eastern Kwangtung and southeastern Kiangsi.

Groff, G. W., and Lau, T. C. Landscaped Kwangsi, China's Province of pictorial art. *Nat. Geog. Mag.* 72(6):671-686 and 695-710, 33 photographs, 1 map, 1937.—This excellently illustrated popular article contains much of interest to the geographer and biologist as well as for the general reader. Notes are given on cormorant fishing. Attention is called to the excellent fishing provided by the quiet water adjacent to natural or artificially constructed rock piles in the river. Fishing is done by cast net and the stone piles constitute property held by ownership deeds. A good fishing pile may be worth \$5,000 Kwangsi currency. W. E. H.

Grote, H. Bruthiologische Bemerkungen über einige Vögel der Mongolei. *Beitr. Fortpflanzungsbiol. Vögel* 7(3):93-99, 1931.—An annotated list of 17 spp. from the Russian work of E. W. Kozlowa, "Die Vögel des südwestlichen Transbaikalgebiets, der nordlichen Mongolei und der zentralen Gobi" (1930) O. J. MURIE in BIOLOGICAL ABSTRACTS

Grumm-Grzhimailo, A. G. [Survey of the latest literature on agriculture in China.] *Bull. Appl. Bot. Gen. & Plant Breed. [Leningrad]*, USSR 21(5):323-354, 1929.—Abstracts of numerous recent papers on the agriculture of China are compiled and commented on.

L. J. PESSIN in BIOLOGICAL ABSTRACTS

Günther, Klaus. Ueber einige von M. Beick am Tien-Schan und in Nordkansu gesammelte Käfer. *Koleopt. Runds.*, Wien, 23(4-5):130-135, 2 text fig., 1937.—A list of known species of Coleoptera is given by families (402 species in 62 genera). *Sternoplax schusteri* (Tenebrionidae) and *Chiromonotus beicki* (Curculionidae) are new to science.

Günther, Klaus. Orthoptera Celebica Sarasiniana. Fam. Acrididae, Subfam. Acrydinae. *Treubia* 16(2) :165-195, 41 fig., 1 tab., 1 map, 1937.—Nearly three dozen species and subspecies, some of which are new, are discussed and figured. There is a table showing distribution and an extensive table for the determination of the genera. This paper will be very useful to anyone interested in the Acrydinae of East Asia. W. E. H.

Hamblin, Stephen F. [Artemisia.] *Lexington Leaflets* 7(12) :45-48, 1937.—Notes on the genus and the more common cultivated species.

Handel-Mazzetti, Heinrich. Neue und bemerkenswerte chinesische Compositen, besonders aus dem Berliner Herbar. *Notizblatt Bot. Gart. Mus. Berlin-Dahlem* 13(120) :607-661, 1937.—Notes are given on 146 species and varieties of Compositae. There are 52 new species (including a few new forms and varieties), distributed as follows. 21 are from Yunnan, 11 from Szechwan, 3 each from Hunan, Hupeh, and Tibet, 5 from Kansu, 1 from Kiangsi, and 2 from Shensi. The new genus *Lierhappia*, based on *V. hieracifolia*, is described.

Hao, K. S. Plantae novae Sinicae. III. *Rept. Spec. nov. Reg. reg.* 42 :83-6, 1936.—Two new grass species are included in the list, namely, *Diarrhena sinica* Hao and *Leersia sinensis* Hao. Diagnoses and notes on locality and differential characters are supplied. G M. R. in HERBAGE ABST.

Hauser, G. *Coptolabrus colestis pingyangensis* subsp. nov. *Societas Ent.* 44(8) :29, 1929.—From China, type in author's collection.

BIOLOGICAL ABSTRACTS

Hayward, Betty Jane. A good primrose from China. *Horticulture* 16(6) :136, 1938.—*Primula chionantha*, a native of northern Yunnan, is recommended for American gardens.

Heberdey, Rudolf F. Revision der palauktischen Arten der Gattung *Notoxus* Geofr. I. Die Verwandten des *Notoxus monoceros* L. *Kolopt. Rundschau*, Wien, 22(3-4), (5) 161-180, 7 tert. fig., 1936.—Numerous varieties, aberrations, etc. are discussed, including *hirtus* Laf. from Tibet, *simulans* Ilbdy from Mongolia, subsp. *trinotatus* Pie and *binotatus* Gebl. from Mongolia, Korea and N. China.

Henrard, J. Th. *Paspalum delarayi* spec. nov. aus China. *Rep. Spec. Nov. Reg.* 24(14-21) :239, 1928.

Hering, Martin. Weitere Bohrfliegen aus der Mandschurei 19. Beitrag zur Kenntnis der Trypetidae (Dipt.). *Mitteil. Deut. Ent. Gesell.* 8(4) :56-62, 1937.—Nine species are discussed, including *Hemilea dimidiata infuscata* n. ssp., *Paroxyyna messalina* n. sp., *P. cleopatra* n. sp., and *Euaresta alniiana* n. sp. A table is given of the species of the *locwiana-plantaginis* group.

Herklotz, G. A. C. The birds of Hong Kong. XXVIII. *Hong Kong Nat.* 8(3-4) :153-158, 2 pl., 1938.—Four species of the family Dicruridae have been recorded from eastern China, all of which have been found in Hong Kong. They are: *Dicerurus macrocercus cathoecus* Swinhoe, *D. leucophæus hopwoodi* Baker, *D. leucogenys cerussatus* (Bangs & Phillips), and *Chibbia hottentotta brevirostris* Cab. & H. Of the Flower-Peckers (Dicaeidae), *Dicaeum cruentatum coccineum* (Scop), *D. minullum olraceum* Walden and *D. ignipictus ignipictus* (Hodgson) occur in China but only the first has been recorded from Hong Kong. Notes are given on description, field identification, habits and nesting of each species.

Herklotz, G. A. C. The flowering shrubs and trees of Hong Kong. Part IX. *Hong Kong Nat.* 8(3-4) :166-177, 2 pl., 6 fig., 1938.—Three families are treated: Ternstroemiaceae with *Ternstroemia japonica* Thunberg,

Tutcheria spectabilis Dunn, *T. microcarpa* Dunn; *Styracaceae* with *Styrax odoratissimum* Champion, *S. suberifolia* Hook & Arn; *Hypericaceae* with *Cratoxylon polyanthum* Korthal. Each genus and species is redescribed. Distribution, flowering period, localities in Hong Kong and references are listed.

Herklotz, G. A. C. Land snakes of Hong Kong. Part IV. *Hong Kong Nat.* 8(3-4):189-200, 2 pl., 3 fig., 1938.—The Chinese Black Cobra, *Naja naja atrata*, is relatively common in the Colony, the King Cobra, *Naja Hannah*, rare. For each there is a discussion of the terminology, identification characters, description, color, and habitat and habits.

Herre, Albert W. C. T. A new Chinese blenny. *Proc. Biol. Soc. Washington* 51:65-66, 1938.—*Salariaus lighti* n. sp. is described from Dodd Island, Amoy, China. A key is given to the 4 known species of Chinese *Salariaus*.
W. E. H.

Herzog, Theodor. Marchantiales. *Symbolae Sinicae* No. 5, p. 16, 1 fig., 1930.—A report on the Marchantiales in Handel-Mazzetti's collection of Chinese plants (from SE. China, mostly Yunnan, Kweichow, Hunan and Szechwan). Five new species, 4 new varieties and one new form are described. There are many records of species new to China or to one of the provinces.

FROM BIOLOGICAL ABSTRACTS

Hirai, K. The canning-manner of the Formosa peach. (In Japanese with title also in English.) *Formosan Agri. Rev.* 376:221-226, 2 fig., 5 tab., 1938.

Ho, Ch'i, and Patton, W. S., 何琦, 派登. Description of the male of *Poitschinskia magnifica* Pleske with a note on the systematic position of the genus. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(4):145-158, 1 pl., 3 fig., 1937.—Body measurements are given for *P. magnifica* and detailed descriptions and figures are given for the head, thorax, abdomen, and terminalia. The genus is placed in the subfamily Hypodermatinae, since it is closely allied to the genus *Hypoderma*.

Honda, M. Revisio Graminum Japoniae. XIII. *Bot. Mag. [Tokyo]* 41(485):377-389, 1927.—Five new species are described from Formosa.

FROM BIOLOGICAL ABSTRACTS

Honda, M. Revisio Graminum Japoniae. XIV. *Bot. Mag. [Tokyo]* 41(491):635-641, 1927.—Among the new species described are 3 from Formosa. There is also a new variety from Formosa and a new species from Korea.

FROM BIOLOGICAL ABSTRACTS

Horn, Walther. Zur Kenntnis der Cicindelinæ der Alten Welt. *Wiener Ent. Zeitung* 44(1-2):33-44, 1927.—An annotated list of new and old *Pogonostoma* forms, including *Cicindela shirakii* n. sp. from Formosa.

FROM BIOLOGICAL ABSTRACTS

Horvath, A. A. Some biochemical aspects of soybean oil. *Oil and Soap* 15(3):75-76, 1938.—The many peculiar effects of soybean oil feeding do not bear evident relationship to the composition of its fatty acids. The known "impurities" as well as some unknown factors seem to play a leading role in defending its properties.

Hotta, Teikichi. Contributions to the knowledge of the systematics of *Morus* in Japan. IX. *Morus* in Honshiu. *Acta Phytotax. Geobot.* 7(1):20-28, 1938.—Five species with their forms and varieties are treated. Four varieties are also recorded from Korea.

Hou, H. C. Infections observed in experimental animals fed upon certain unbalanced diets. *Chinese Med Jour.* 53(1):47-52, 2 tab., 1938.—There was found a high incidence of spontaneous infection in rats fed on diets only deficient in vitamin A or coupled with some other unbalanced dietary conditions. Increasing the vitamin D content of a vitamin A deficient diet tended to increase the incidence of spontaneous infection over and above any of the other groups. In a vitamin A deficient diet a high casein and low starch content induced in rats a high incidence of skin infection not observable in other groups. Rats fed on an oat diet with the addition of normal amounts of vitamins A and D developed a relatively high incidence of infection and an unusually high incidence of taenia infection of the liver, although the animals had a life span four times longer than that of the other groups.

AUTHOR'S SUMMARY

Hsiung, T. S., 胡大仕. A survey of the ciliates of Chinese equines. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 6(6):289-304, 3 pt., 1936.—Fecal material of 14 out of 20 horses, donkeys and mules, in Tientsin, showed the presence of Protozoa. Ciliates were predominant in number. Thirty species are described and 26 of them figured. *Polymorpha pellucida* is a new species.

Hu, H. H., 胡先驥. Notulae systematicae ad florem Sinesium VIII. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(1): 31-46, 1937.—The author describes 9 new species (*Corylus Wangii*, *Artocarpus yunnanensis*, *Manglietia Wangii*, *Michelia Dandyi*, *Camellia heterophylla*, *Hartia robusta*, *Tilia yunnanensis*, *Steircula lantsangensis*, *S. yunnanensis*), the new varieties *Corylus chinensis* var. *macrocarpa*, and *Acer Francheti* var. *majus*. Taxonomic notes are given on 3 other species. All new forms are from Yunnan.

Hu, H. H., 胡先驥. *Smomerrillia*, a new genus of Celastraceae. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(1) 47-51, 1937.—The genus seems to be an anomalous one and is represented by the new species *S. bracteata* from S. Yunnan.

[Il'in, M. M.] New species of Compositae. (In Russian with English summary.) *Bull. Jard. Bot. Prince, URSS.* 27(1):80-92, 1928.—Fourteen new species and a new subspecies are described. Included are *Serratula koreana* from Korea; *S. rugosa*, *S. potanini*, and *S. strangulata* from China; *S. kumaroni* from Manchuria; *S. polyccephala* from Mongolia, and the new section Suffruticosae, based on *S. forrestii* from China.

FROM BIOLOGICAL ABSTRACTS

Innes, Wm. T. Water hyacinth, foe or friend? *The Aquarium* 6(2): 34-35, 1 fig., 1937.—This note concerns the nearly cosmopolitan *Eichhornia crassipes* Solms which is a respected flower or a terrible weed depending upon its location. In some places it is costly to navigation. The present article refers to this plant in connection with its use for spawning of goldfish and tropicales for which it is well adapted. The reviewer used this plant in rearing aquatic Hemiptera in the Philippines and found it entirely suitable for the oviposition of the water scorpions of the genera *Laccotrephes* and *Ranatra*.

W. E. H.

Irmscher, E. Beitrag zur Kenntnis der ostasiatischen Begonien. *Mitteil. Inst. Allgem. Bot. Hamburg* 6(3):343-360, 2 fig., 1927.—A study based upon the collections of Handel-Mazzetti in southwestern China. Due to the fleshy nature of these plants they are difficult to press properly and the dried material is therefore rather unsatisfactory for study. The placenta is important as a sectional character, but it is almost impossible to determine this by the usual method of boiling the flower. By adding alkali to the solution the position of the placenta could be determined in the boiled material.

Too many new species have been carelessly made in *Begonia* by authors unacquainted with the older described species and with the very different aspects of the same species depending upon the way the specimens were dried. Detailed ecological notes are given for each species treated. The following are new: *Begonia calophylla*, *B. digyna*, *B. lipungensis* and *B. asperifolia*.

D. D. KECK in BIOLOGICAL ABSTRACTS

Irukayama, S. On the agricultural management in Formosa. (In Japanese with title also in English.) *Formosan Agri. Rev.* 376:166-179, 14 tab., 1938

Ishiwata, S. On the grasseerie of *Antheraea pernyi* Guérin Menv. (In Japanese with English summary) *S. Manchuria Rly. Agri. Expt. Sta. Res. Bull.*, No. 19.31 72, 4 pt., 1937.

Iwata, Kunio. Die Crabronen aus den Kurilen, Sachalin und Hokkaido (Dipt., Nematocera). *Ins. Matsumurana* 12(2-3):81-88, 1938.—Thirty-one species and subspecies (some new) in the genus *Crabro* are discussed. Some of the species are very widely distributed and the following, because of their distribution, are of interest to us: *Crabro konouii* Kohl, *C. nidiifrons* Perez, and *C. heros* Kohl, all from Korea, and *C. alatus* Panzer und *C. ambiguus* Dahlbom from Manchuria. W. E. II.

Jackson, R. B. A guide to the identification of the anopheline larvae of the colony of Hong Kong. *Chinese Med. Jour.* 53(3):259-270, 14 fig., 1938—Prefaced by a brief morphological description of anopheline larvae, the paper is discussed under the following heads: collection, examination, preservation and mounting, anophelines of the Colony (10 species and varieties), pathogenicity, breeding places, rice cultivation, hill streams, and finally a table for the identification of full-grown larvae. Structural drawings of a larva show the characters used in classification. W. E. II.

Jaeckel, Siegfried. Zur Kenntnis der Mollusken der chinesischen Provinz Fukien. *Zool. Anz.* 81(7-10):197-201, 1929.—An annotated list of 55 spp., of which 5 are apparently new for China. BIOLOGICAL ABSTRACTS

Jedlicka, A. Neue palaarktische Carabiden. II. (Coleopt.) *Wiener Ent. Zeitung* 45(2-3):92-96, 1928—The present paper contains: *Harpalus (Pardilens) horni* n. sp. and *H. (P.) pecukai* n. sp. from China; key to species of *Pardilens* and 2 new species from Baikal

FROM BIOLOGICAL ABSTRACTS

Joubin, L. Travaux Océanographiques exécutés par la France dans l'Océan Pacifique Notes, Inst. Océanog. l'Indochine, No. 29:7-8, 1936—A record of explorations carried on 1930-32 in the south China Sea.

Jung, Goey-park, 張巨伯 A few important cotton insects in Chekiang. (In Chinese with title also in English.) *Bur. of Ent., Chekiang, Spec. Publ.* No. 19.1-6, 1933 [Received May 1934]—*Pectinophora gossypiella* Saunders, *Earias chromataria* Wk, *Boarmia* sp., *Sylepta derogata* Fabr., and *Agrotis* sp. are considered as important cotton insect pests in Chekiang. Notes on the damage, external anatomy, life history, and methods of control are given for each species. Y. C. NG

Kamo, I. New method of the castration of rice. (In Japanese with title also in English.) *Formosan Agri. Rev.*, No. 374:2-6, 1 fig., 4 tab., 1938.

Kano, T. A list of Cicindelidae and Cerambycidae from the island of Botel-Tobago (Kotosho), with a consideration of its insect fauna. *Kontyu* 3(2):76-82, 1929.—Eleven cicindelids and 19 cerambycids are

reported from this island near Formosa. The insect fauna of the island is more closely related to that of the Philippines than to that of Formosa.

FROM BIOLOGICAL ABSTRACTS

Karny, H. H. On a collection of grylacrids and tettigoniids (Orthoptera), chiefly Javanese. *Ann. Ent. Soc. Amer.* 22(2) :175-196, 1 pl., 8 fig., 1929.—Thirty-four species are discussed. *Gryllacris melanocrania* n. sp. is from China.

FROM BIOLOGICAL ABSTRACTS

Kelsall, A., and Stultz, H. T. Pyrethrum and derris dust. *Rept. Ent. Soc. Ontario* 67 (1936) :20-29, 1937.

Kim, Anne C. Village life in Korea. *Jour. Geog.* 36(8) :315-320, 1937.—There is a brief description of a small village with notes on customs and occupations.

Kiritschenko, A. N. Entomologische Sammelergebnisse der Deutschen Hindukusch-Expedition der Deutschen Forschungsgemeinschaft. Hemiptera-Heteroptera. *Arb. morph. tax. Ent. Berlin-Dahlem* 5(1) :1-7, 1938.—Twenty-five species, including four new ones, are described in the families Pentatomidae, Coreidae, Myodocidae, Pyrrhocoridae, Reduviidae, and Miridae.

W. E. H.

Kislovsky, D. The domestic animals of Mongolia. *Jour. Heredity* 29(1) 27-32, 4 fig., 1938.—This is a review of the book, "Domestic Animals of Mongolia," J. J. Luis, editor. It contains 432 pages and is published by the All Russian Academy of Sciences, Moscow, 1936. The book contains 10 papers, 7 of them summarizing the results of an expedition of the Academy in 1931. Animal husbandry methods are discussed for sheep, horses, cattle, yaks, and hybrids.

Kitamura, Siro. Les *Senecio* du Japon. (In Japanese with Latin descriptions.) *Acta Phytotar. Geobot.* 6(4) 265-275, 1937.—The new species *S. burubonensis*, is from Korea; *S. Faurei* Level & Vaniot is reported from Korea, Manchuria, China and Formosa.

Klein Schmidt, O. *Lanessa urticae kansuensis* form. nov. *Falco* 23(1) 4, 1927.—*L. u. f. kansuensis*, Kansu, China. Type in author's collection.

BIOLOGICAL ABSTRACTS

Kobayashi, A. A few factors associated with the growth of fruit in selecting the pollinator for the Chinese pear. *Jour. Hort. Assoc. Japan* 8 :169-177, 1937.—The author's experiments with several varieties of Chinese pear, although unfinished, give the following indications:—the younger the pistils after the opening of the flowers, the higher will be the rate of fruit set and the greater will be the increase in weight of the fruit; the later the date of pollination after flower opening, the greater will be the delay in fruit growth in its earlier stages. This suggests strongly that the blossoming period of the pollinator should be as close to that of the orchard variety as is possible.

FROM HORTICULTURAL ABSTRACTS

Kobayashi, Teichi. Ordovician fossils from Corea and South Manchuria. *Japanese Jour. Geol. & Geogr. Trans. & Abstr.* 5(4) 173-212, 5 pl., 7 fig., 1928.—Thirty-six cephalopods from the Tofango and Chikunsan beds are described and figured. Twenty-one are new to science and two represent new genera. The Tofango fauna has 9 cephalopods in common with the Machiaou, and the 2 formations are correlated with the Trenton-Black River of N. Amer.

C. H. KINDLE in BIOLOGICAL ABSTRACTS

Koidzumi, G. Contributions ad cognitionem florae Asiae orientalis. *Acta Phytotar. Geobot.* 6(3) :210-223, 1937.—Many new species are described from Japan. *Clematis Komaroviana* Koidz. is from Korea.

Koidzumi, Makoto. On the distribution of *Auopheles* in Formosa. *Dobutsugaku Zasshi* 40(476):210-229, 1928.

Koidzumi, Makoto. On the medical investigations of precautionary measures against *Anopheles*. *Dobutsugaku Zasshi* 40(475):189-198, 1928.—In Formosa, 14 species of *Anopheles* have been found which show affinity for *Plasmodium vivax*, 3 with *P. malariae*, and 4 with *P. immaculatum*.

FROM BIOLOGICAL ABSTRACTS

Kojo, K. Investigation of sweet-potato culture in Formosa. (In Japanese with title also in English.) *Formosan Agri. Rev.*, No. 374. 28-49, 6 tab., 1938.

Kon'no, Enzo. On genera *Tingia* and *Tingiostachya* from the Lower Permian and the Permo-Triassic beds in northern Korea. *Japan Jour. Geol. & Geogr.* 6(3-4):113-147, 1 map, 5 pl., 2 fig., 1929.—*Tingia*, foliage shoot, and *Tingiostachya*, fertile shoot, were found together in a coal-field of northern Korea. The author thinks it probable that the latter represents the reproductive part of the former. On a basis of morphological study he concludes that the *Tingia* shoots are foliage branches given off laterally or almost horizontally on the ground, and somewhat obliquely in reference to their inclined or creeping stem, just as in the recent *Selaginella* or *Lycopodium*. In respect to the reproductive part *Tingia* resembles also either *Selaginella* or *Lycopodium*, inasmuch as its fertile shoot was notably standing vertically on the ground. But in structure of its reproductive organ (i.e., *Tingiostachya* with its tetralocular synangia) it differs widely from these 2 genera and finds its closest relative rather in the recent *Psilotaceae*, though also widely differing from the latter. The following are described. *Tingia hamaguchi* n. sp., *T. parita* Halle, *T. elegans* n. sp., *T. cf. carbonica* (Schenk), *Tingiostachya tetralocularis* n. sp.

COUR. JAP. JOUR. BOT. in BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Einige Allecuhden-Arten aus Japan und Formosa (Col.). *Ins. Matsumurana* 4(3):95-99, 1930.—*Hymenalia rufipennis* Mats. and *Cistelina melanopyga* Fairm. are recorded for the first time from Formosa and the new species *Isomia matsumurai*, *I. formosana*, *Ctenopinus unicolor*, and *C. taiwanus* are described from there.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Beitrag zur Silphiden-Fauna Japans (Col.). *Ins. Matsumurana* 3(4):157-165, 1 fig., 1929.—*Nicrophorus latifasciatus* and *Silpha obscura* are reported from Korea.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Die Cleoninen Japans (Col. Curc.). *Ins. Matsumurana* 4(1-2):49-63, 1929.—Twenty-four species and 5 subspecies are treated. The new genus *Tenguzo* is described. Five new species and 2 new subspecies are described from Formosa.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Die Lagrinden Japans (Col.). *Ins. Matsumurana* 4(1-2):25-30, 1929.—Keys are given to Lagriinae and Statirinae. *Lagria kikuchi* n. sp., *Arthromacia abnormalis* n. sp., *Anisostira abnormalipes* fs. *abdominalis*, *flavipes*, and *kikuchi*, n. forms, are from Formosa.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Die Lamellicornien aus den Kurilen, II (Zehnter Beitrag zur Kenntnis der Käferfauna der Kurilen). *Ins. Matsumurana* 12(1):6-8, 1937.—Nine species are listed. Of these several will interest workers in China because of their distribution. These are: *Geotrupes (Phelotrupes) auratus* Motsch. (Korea), *A. (Colobopterus) indagator* Manner. (Korea), *Aphodius (Phaeaphodius) rectus* (Motsch.) (China), and *Liocota brevitarvis* Lewis (Korea).

W. E. H.

Kôno, Hiromichi. Langrussler aus dem Japanischen Reich. 1. *Ins. Matsumurana* 4(3) :137-143, 1930.—A list and a key to the Japanese species of *Alcides* are given, with descriptions of new forms, including *A. trifidus* ssp. *taiwanus*, *A. takahashii*, *A. albomaculatus*, and *A. ashinagazo*, from Formosa. *A. scenicus* Faust and *A. roelofsi* Lewis are recorded from Formosa.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Die Mordelliden Japans (Col.). Zweiter Nachtrag. *Ins. Matsumurana* 4(3) :104, 1930.—*Anaspis marseuli* Csiki is recorded from Formosa.

FROM BIOLOGICAL ABSTRACTS

Kôno, Hiromichi. Eine neue *Alcides*-Art aus Korea (Col., Curc.). *Ins. Matsumurana* 12(1) :49, 1 tert fig., 1937.—The Curelioniid *Alcides saitoi* n. sp. is described from a single male specimen. W. E. H.

Kôno, Hiromichi. Neue und wenig bekannte Käfer Japans II. Oedemeridae. *Ins. Matsumurana* 11(4) :135-146, 8 fig., 1937.—A new genus (*Anancosessinia*) and several new species are described from Japan and from Micronesia. *Chrysanthia integracollis* Heyden is recorded from Korea; *Anancosessinia tarsalis* n. sp. is recorded from Formosa. W. E. H.

Kôno, Hiromichi. Die Pyrochroiden Japans. *Ins. Matsumurana* 3(203) :62-72, 2 fig., 1929.—Twenty-two species and 2 varieties of this family are now known to occur in the Japanese Empire. The new species *Pseudopyrochroa taiwana* and *P. carinifrons* are from Formosa.

FROM BIOLOGICAL ABSTRACTS

Kräanzlin, Fr. Cytrandreae quaedam novae. *Rep. Spec. Nov. Regni Veg.* 24(14/21) :214-223, 1928.—New species described include: *Petocodon longistylus* and *Lystonotus wilsoni* from central China; *Oreocharis tonkinensis* and *Conandron rhynechotechioides* from Indo-China.

FROM BIOLOGICAL ABSTRACTS

Krascheninnikov, H. M. Compositae Asiae mediae et orientalis novae. *Rep. Spec. Nov. Reg. Leg.* 26(1-6 26-30, 1929.—Among other contributions, *Tunacetum potanini* var. *suffuticosum* and *T. p.* var. *nanum*, n. varieties, are described from China.

FROM BIOLOGICAL ABSTRACTS

Krempf, A. La conservation et l'utilisation des produits de la pêche sous les tropiques. *Notes*, Inst. Oceanog. l'Indochine, No. 29 :31-37, 1 tab., 1937.—Methods of preserving fish and fish products under conditions where refrigeration is unavailable are discussed.

Krempf, Armand. Enregistrement du cycle maregraphe de 18 ans 2/3 par le polypier en voie de croissance de quelques coralliaires. *Notes*, Inst. Oceanog. l'Indochine, No. 31 :15-21, 2 fig., 1936.—Corals, by the levels of their growth, are precise indicators of variations of sea level. From the structure of coral banks geologists are able to trace even slight variations that occurred in the past. Fossil corals furnish a convenient record for the study of the effects of astronomical phenomena and of chronometry of the past.

Krempf, A., and Chevey, P. Le plateau continental indochinois et les relations anciennes entre l'Indochine et l'Insulinde. *Notes*, Inst. Oceanog. l'Indochine, No. 29 :23-29, 1 fig., 1 tab., 1936.—The continental shelf of Indochina presents a series of submarine terraces and valleys extending toward the islands of the China Sea. It is possible to trace the course of great rivers that were present before the land was submerged. It is considered probable that the presence of an ancient land connection explains the remarkable affinity of the ichthyological fauna of Indochina with that of these islands, now separated by a stretch of sea.

Kryshťofovich, A. A liverwort from the Middle Daido formation of Korea and the Nikan series of the Manchurian border. *Ann. Soc. Paléont. Russie* 8:144-147, 1 pl., 1928-29 (1930).—The fossil plant, *Sagenopteris bilobata* v. *major* Yabe, is found to be a liverwort and is designated *Marchantites yabei* n. sp. It is from Siberia and Korea. *M. jimboi* is a new combination for *Stenopteris jimboi* Krysh.

BIOLOGICAL ABSTRACTS

Ku, Chang-tung, 顧昌棟 Two new trematodes of the genus *Notocotylus*, with a key to the species of the genus. *Peking Nat. Hist. Bull.* 12(2):112-113, 3 fig., 2 tab., 1937.—The new species, *N. orientalis* from *Melanonyx fabalis serrirostris* Swinhoe, and *N. anatis* from *Anas domesticus* var. *pekinensis*, are described and figured. The former is from Soochow, the latter from Peiping. A key is given to 17 species of *Notocotylus*. There is also a table of characters and hosts.

Kükenthal, G. Cyperaceae novae IX. *Rep. Spec. Nov. Reg. Veg.* 27(726-733):107-112, 1929.—Seven species of *Carex* are reported as new to China. Three new varieties of *Cyperus*, *Scirpus mattfeldianus*, *Carex keugii*, *C. kiansuensis*, *C. retrofracta*, *C. hastata*, and *C. poculiglaua*, n. spp., and a new form and a new variety of *Carex* are described.

FROM BIOLOGICAL ABSTRACTS

Kung, Hsien-Wu. Amarantaceae, Chenopodiaceae, Phytolaccaceae and Portulacaceae. *Flore Illustrée Du Nord de la Chine, Hopei (Chihli) et ses Provinces Voisines*. Inst. Bot. Acad. Nat. Peiping Fase. 4, p. 1-107, pl. I XL, 1935.—An additional fascicle of this series devoted to the illustration of plants in Chihli Province. In this case 40 species are illustrated with large beautiful plates. Each species is fully described both in Chinese and English, and notes added as to locality. In addition, bilingual keys are added to the genera of these 4 families and the species within each genus. F. P. METCALF

Kung, Lan-chen, 蘭勤珍. The Chinese diet. *Nutrition Notes*, No. 8, 9 p., 1 tab., 1937.—This is an evaluation of surveys on diet carried out in China on Chinese subjects. Cereals contribute more than 80% of the caloric intake. Proteins are apt to be sufficient in quantity but deficient in quality, since they are most often derived from vegetable sources. Phosphorus and iron, but not calcium, are generally present in sufficient quantities. Vitamins are apt to be deficient, especially in the diet of the more prosperous classes who can afford refined foods. Insufficient studies have been made of all groups except the normal adult.

[Kuo, Chih Liang], 郭志良. [Cellulose refuse through fermentation] (In Chinese). *Science* 22(12):33-43, 9 tab., 1938.—The waste products of cellulose, such as cotton seed coats, wheat chaff, stems of hemp, sawdust, and refuse from paper industry, etc., are found to be useful. Alcohol and acetic acid can be obtained through fermentation by bacteria, *Bacillus*, and combustible gas by a kind of an aerobic bacteria. By means of fermenting the wood sugar, a great quantity of alcohol can also be obtained. Fermentation of xylose, catalyzed by certain bacteria and mold, produces sixteen different kinds of chemicals, such as acetic acid, acetyl methyl carbinol, 2,3 butylene glycol, propionic acid, etc. Exact mechanism in each process and the intermediate products are discussed in the paper. Twenty-seven references are given.

Y. C. Ng

Kurosawa, M. Descriptions of four new thrips from Japan. *Kontyû* 11(3):266-275, 1 pl., 2 fig., 1937.—The species described include *Frankliniella litorea*, infesting lily bulbs in Japan, Korea, Manchuria and China.

FROM REV. APPL. ENT.

Lang, M. C. [The experiments with soil of Ruchu.] *Jour. Agri. Assoc. China* 72:57-66, 1930.

Lee, Jonquei S. Fusulinidae of North China. *Mem. Geol. Surv. China, Palaeontologia Sinica B* 4(1) :i-vii and 1-172, 24 pl., 21 fig., 1927.—Only in a few coalfields of North China, as for instance in the area of NW. Chihli, is Fusulina limestone absent. In a few localities of the latter Fusulinidae are not found in great abundance. Fusulina limestone usually is represented by several layers (up to 7-8) and occupies the lower part of coal-bearing formations, overlying Ordovician and Pre-Cambrian strata and underlying the Permian. Fusulina limestone is usually very persistent and is interstratified with shales, sandstones, etc., which are always variable in their lithological character and thickness. Among 47 described species 17 are new; 7 are found in the Carnic Alps, 2 in the Salt Range of India, 2 in Darvas, central Asia, 6 in eastern Asia, 1 is a cosmopolitan form, the rest identical with or closely related to those occurring in the Russo-Arctic region. Very few elements are common with the fauna of SW. China and Indo-China and these are also known from Russia. Apparently some barrier across central China in Upper Carboniferous time separated the northern from the southern provinces. Relation between Chinese Fusulina fauna and that of N. Amer. is very remote; at that time the Pacific water and the great Mediterranean were kept apart. No attempt has been made to define zonal subdivisions, but 2 Fusulina fauna were found to be well separated: the lower, older one of Moscovian age with *Fusulinella sphaeroidea*, *Neofusulinella bocki*, *Girtyina konnai*, *G. cylindrica*, *Bradyina uantiliformis*, etc.; the upper one, Uralian, with numerous species of *Shellrienia* and *Schwagerina*. Old terms referring to the structure of the shell are revised and redefined, and new ones introduced. The following structures and parts of the shell are distinguished: chambers, theca, spirotheca, antitheca, tectum, osseum, tectorium, buccal aperture, aptychi. For description of species, relations between different dimensions are profitably used, e.g., the axial ratio, i.e., the ratio between the axial length of each whorl and the width or breadth of the same whorl in the median position. Also graphic methods have been found to be very convenient. In ordinary cases graphs showing the width of the successive whorls are sufficient to distinguish a species from its related forms.

I. P. TOLMACHOFF in BIOLOGICAL ABSTRACTS

Lee, Shao Chang. China: ancient and modern. *Pan-Pacific* 1(3) : 3-9, 1937.—Excerpts from a conspectus of Chinese history, prepared by Dr. Lee for the University of Hawaii of which he is Professor of Chinese History and Language.

Lefevre, Rufus H. Birds of China. *Auk* 46(4) :494-501, 1929.—Discussion of the place of birds in the life of the Chinese with sidelights on the ornithology of China, under headings of falconry, domestic birds, capture of wild birds, shooting of birds, cage birds, training birds, etc.

J. T. NICHOLS in BIOLOGICAL ABSTRACTS

Legendre, F. Le parasitisme intestinal au Cambodge. *Bull. Soc. Path. Exot.* 30(7) :570-572, 1937.

Li, Feng-swen, 今鳳藻. The life history and control measures of the cotton leaf-roller, *Sylepta derogata* Fabricius. (In Chinese with English title and summary.) *Bur. of Ent., Chekiang, Tech. Bull.* No. 12 : 73-98, 2 pl., 18 tab., 1933. [Received May 1934]—The cotton leaf-roller, *Sylepta derogata* F., was studied in Nantung, 1930, and in Shanghai, 1931. It has been reported from Asia, Africa, and part of Australia. In Shanghai, there are probably four generations a year. It requires 40 days to complete its development. The incubation period requires 3 days; larval stage, 22 days; pupal stage, 8 days; and adult lasts 7 days. It is found hibernating in mature larval form. This species attacks cotton, *Malva*, *Hibiscus mutabilis*, *Sterculia platanifolia*, and *Hibiscus syriacus*. In the months of September and October, severe damage has been done on cotton. There are eight

hymenopterous parasites which attack the larvae, and one attacks the pupa: about 50% of the larvae have been attacked by one chalcid. Planting cotton early, cleaning fields thoroughly, using light trap for moths, spraying the larvae with Paris green and lead arsenate, and protecting and encouraging natural enemies are considered as valuable remedies for this pest. The adult, pupa, and larva of each species, *S. derogata* and the chalcid, are figured.

Y. C. Ng

Li, L. C., 李真慶 Freshwater Algae from Anhwei, Kiangsi and Hupeh. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(1) :1-30, 2 tab., 1937.—A study was made of 110 species and varieties (exclusive of diatoms), belonging to 57 genera, 23 families and 3 classes (Chlorophyceae, Heterokontae, Myxophyceae). Fourteen species are reported as new to Anhwei, 24 to Kiangsi, 53 to Hupeh and 14 as new to China. Measurements and collecting notes are given for each species. Two new species were found: *Zygnemopsis wuchangensis* and *Aulosira sinensis*.

Limprecht, W. Nachtrage zu *Pedicularis*. *Rept. Spec. Nor. Reg. Leg.* 23(18-25) :333-339, 1927.—Additional notes on 85 species of *Pedicularis*, for the most part collected by J. F. Rock, in Yunnan, China.

BIOLOGICAL ABSTRACTS

Lin, S. Y. The *Hilsa* herring, notes on the life history of *Hilsa reevesii*. (Richardson). *Hong Kong Nat.* 8(3-4) :245-248, 14 fig., 1938.—This herring spawns in rivers along the coast from Hainan Island to Manchuria, between April and July. Breeding, eggs, and larva are described in some detail.

Lindholm, W. [Die ersten Schnecken (Gastropoda) aus dem See Kosogal in der Nordwest-Mongolei.] *Comp. Rend. Acad. Sci. URSS Leningrad, Sér. A* 1929(13) :315-318, 2 fig., 1929.—The new form *Lymnaea (Radix) auricularia* f. *kosogolensis* and *Kobeltoctoclelea michnoi* n. sp. are described. On the basis of the occurrence of the genus *Kobeltoctoclelea* and of *Thymallus arcticus beciculus* (Salmonidae) in both Lake Kosogal and Lake Baikal, the limits of the Baikal subregion are extended to include the former lake and also the Egin-Kol and Selenga Rivers, which connect the 2 lakes.

BIOLOGICAL ABSTRACTS

Liu, Chungshee H. On the jew's harps from Hainan Island. (In Chinese with English summary.) *Science* 22(1-2) :12-24, 8 fig., map, 1938.—The instrument is said to have originated in southern Asia, from where it has become widely distributed. It was recently discovered in Hainan Island in use among the Li people. Three instruments are described, two of bamboo and one of brass.

Loesener, Otto. Übersicht über die Arten der Gattung *Leratrum*. *Rep. Spec. Nor. Reg. Leg.* 24(4-13) :61-72, 1927; 25(1-3) :1-10, 1928.—A survey of all species of the genus, including a list of synomvms and excluded species. Many new species and varieties are described, including several from China, Korea, Tibet, Manchuria and Formosa. Keys to subgenera and to smaller subdivisions are given.

FROM BIOLOGICAL ABSTRACTS

Lohberger, Karl. Weitere Fische aus Thian-Schan. *Akad. Wiss. Wien, Math.-Naturwiss Kl. Sitzungsber Abt. I* 138(7) :335-345, 5 fig., 1929.—Contains a supplement to the previously published article entitled "Fische aus Thian-Schan," and gives a descriptive list of 16 species previously known.

BIOLOGICAL ABSTRACTS

Ma, W. C. The vascular system in the spleen of rat and mouse. *Peking Nat. Hist. Bull.* 12(2) :71-77, 6 pl., 1937.—The vascular system of the spleen is not constant but changes all the time. The arteries have branches

of the ordinary type and in addition confluent branches which originate from trabeculae and grow to the artery at right angles. The walls of the confluent artery fuse with those of the main artery, but before they anastomose a partition separates the two lumina. This partition is replaced by a valve-like sphincter which is described here for the first time and which may regulate the blood stream in a larger area than the sphincters suggested by Knisely's physiological experiments. A certain developmental stage of the confluent artery resembles the sheathed artery mentioned in the literature, another the so-called ampulla. There are two types of sinusoids, one arising by the accumulation of developing erythrocytes and another one formed out of an artery by degeneration. Veins may be formed by degeneration of arteries. Sinusoids and veins may be destroyed by the invasion of undifferentiated reticular cells. They become red pulp.

AUTHOR'S SUMMARY

Mader, Leopold. Zur Variabilitat der Meloiden und Coccinelliden. *Ent. Anzeiger* 9(6) :108-114, 3 fig., 1929.—Among many new aberrations described is *Mylabris 4-signata* ab. *antennata* from Tien-Shan.

FROM BIOLOGICAL ABSTRACTS

Maglioni, R. Archaeological finds in Hoifung Part I. *Hong Kong Nat* 8(3-4) :208-244, 2 pl, 8 fig., 1938.—Many valuable finds were made at prehistoric sites in this district of Kwangtung. An analysis of types of cultures, based on finds made, is attempted.

Malloch, J. R. Exotic Muscidae (Diptera). 21 *Ann. & Mag. Nat. Hist.* 1(4) 465-494, 1928.—Among the many species discussed, *Strongylyoncuria pseudolucilia* n. sp is described from Szechwan

FROM BIOLOGICAL ABSTRACTS

Manalang, Cristobal. Intergovernmental conference of Far Eastern countries on rural hygiene with particular reference to leprosy. *Jour. Phil. Is. Med. Assoc.* 18(3) 125-134, 1938.—A conference was held on August 3-13, 1937, at Bandoeng, Java, at the invitation of the Netherlands Government. Discussions were held on the following topics: Health and medical service, Sanitation and sanitary engineering, Nutrition, Measures for combating malaria, plague, ankylostomiasis, tuberculosis, pneumonia, yaws, mental diseases and leprosy. Epidemiological work on leprosy is reviewed. A resolution of the Conference recommends: isolation of lepers in as nearly normal conditions as possible; the provision of an actively working treatment center for each colony; improvement of the social, economic and hygienic standards of the rural populations in general; intensive and continuous investigation, with special reference to transmission. The possibility of the liberalizing of leprosy control by allowing freedom to lepers, but preventing their contact with very young children, was discussed.

Mandl, Karl. *Cicindela silvatica* L. und ihre Rassen. *Koleopt. Punds* 23(4-5) :136-140, 21 fig., 1937.—The world distribution, including N. Mongolia and Manchuria, is given for this species.

Martin, J. P. Forestry in Formosa. *Hawaiian Planters' Rec* 31(3) :317-318, 9 pl, 1930.—Illustrations with notes.

BIOLOGICAL ABSTRACTS

Martynov, A. B. On the trichopterous fauna of China and eastern Tibet. *Proc. Zool. Soc London* 1930 (1) :65-112, 1 pl, 71 fig., 1930.—This paper is based on material from China, Tibet, Japan, and Formosa in the Brit. Mus. About 46 (28 new) species are listed with locality records and taxonomic remarks. The paper is concluded with a list of 62 spp known from China, excluding Szechwan, and a list of 65 spp. from east Himalayas, Assam, Szechwan, Kham, Tsaidam, Nan-Shan, and Ordos.

FROM BIOLOGICAL ABSTRACTS

Masamune, Genkei. Deux espèces nouvelles de la région alpine de Formose. *Not. Syst.* 6(1) :37-38, 1937.—*Anemone takasagomontana* and *Tainia gokanzanensis*, n. species, are described from Mt. Gokanzan, Taituyusu.

Masera, E. Influence du mâle infecté de *Nosema bombycis Naegeli*, pour le transmission de la pébrine du *Bombyx mori* L. (Note préventive.) *Boll. Sez. Ital.* 9(12) :442-444, 1937.

Masera, E. Observations sur la naissance de larves infectées des œufs des papillons de *Bombyx mori* L. affectés de pébrine. (Note préventive.) *Boll. Sez. Ital.* 9(12) .444-446, 1937.

Mason, T. G., and Phyllis, E. A note on a new method of control for insect pests of the cotton plant. *Trop. Agriculture* 15(2) : 45, 1938.—Plants to which selenium had been applied at the roots appeared to poison but not to repel aphids and cotton stainers (*Dysdercus howardi* Ballou).

Matsumura, S. Generic revision of the palaearctic Notodontidae. *Ins. Matsumurana* 4(1-2) :78-93, 1929.—Keys are given to the palaearctic subfamilies and the genera of the subfamilies Dudusinae, Staurociniae, and Cerurinae, and all the genera are described, with lists of the Japanese species. Four new genera are proposed. The new species *Dudusopsis horishana* and *Dicranura formosana* are described from Formosa, *Quadricalcarifera coreana* from Korea
FROM BIOLOGICAL ABSTRACTS

Matsumura, S. New noctuid moths from Formosa. *Ins. Matsumurana* 3(2-3) :114-119, 1929.—The new genera, *Akonus*, *Akoniodes*, *Conicophoria*, and *Mesocrapex*, and 9 new species are described.
. FROM BIOLOGICAL ABSTRACTS

Matsumura, Shonen. New *Onthophagus*-species in Japan with a tabular key. *Ins. Matsumurana* 11(4) :150-169, 1937.—Thirty-two species, many of which are new, are included and a key is prepared for them. Those whose range interest us are: *Onthophagus kandai* n. sp. (Honshu and Korea), *O. tricornis* Wied (Indo-China and Formosa), *O. uedanus* n. sp. (Honshu and Korea).
W. E. H.

Matsumura, S. New species and genera of Notodontidae. *Ins. Matsumurana* 4(1-2) :36-48, 1 pl., 1930.—Eighteen new species, 9 of them representing new genera, and 2 new subspecies are described from Formosa.
FROM BIOLOGICAL ABSTRACTS

Matsumura, Shonen. Onthophagid-insects from Formosa. *Ins. Matsumurana* 12(2-3) :53-63, 1938.—Forty-six Onthophagid insects are listed from Formosa including one new genus and thirteen new species herein described. Seventeen of the species also occur in China. The new genus is *Matashia* (type *M. mushana* n. sp.). It differs from *Onthophagus* Latr., to which it is closely allied, in having the anterior tibia nearly twice as long as the mid-tibia, the 4 teeth occupying only the anterior half of the tibia, the apical spur at the apex divided into two nearly equal branches forming a fork.
W. E. H.

Matsumura, Shonen. The Onthophagid-insects from Korea with descriptions of new species. *Ins. Matsumurana* 12(1) :1-6, 1937.—Twenty species including *Onthophagus punctator* Reitt. and *O. rugulosus* Har. also from China (without locality) and *O. miyabei* n. sp., *O. nakatomi* n. sp., and *O. shoyozanus* n. sp., also from Manchuria, are included. Altogether seven new species are described.
W. E. H.

Matsumura, S. Some new butterflies from Japan, Korea and Formosa. *Ins. Matsumurana* 2(4) :139-142, 1929.—*Ypthima elongatum* is from Korea; *Y. praenubila* ssp. *kanonis* from Formosa.

FROM BIOLOGICAL ABSTRACTS

Matsumura, S. Some new butterflies from Korea received from Mr. T. Takamuku. *Ins. Matsumurana* 3(4) :152-156, 1929.—Two new subspecies and 14 new forms are described.

FROM BIOLOGICAL ABSTRACTS

Matsumura, Shonen. Two new Lycaenid-butterflies from Korea and Formosa. *Ins. Matsumurana* 12(2-3) :107-108, 2 fig., 1938.—*Rapala tetsuzana* (allied to *R. nissa* Koll) is described from Korea; *R. sankakuhonis* (closely allied to *R. repercussa* Leech from China) is described from Formosa. Both species are figured.

W. E. H.

Matsushita, Masaki. Neue und wenig bekannte Bockkäfer aus Shikoku (I. Okubo's und M. Okamoto's Ausbeute). *Ins. Matsumurana* 12(2-3) :99-106, 1938.—Twenty-two species including two new genera and two new species are treated. Three of the species occur in Korea. The new genera and species are: *Itohigia bimaculata* and *Tengius okuboii*, the former genus being related to *Xylorhiza*, the latter with *Clytosemia*.

W. E. H.

Matsushita, M., and Tamanuki, K. Einige neue Formen der japanischen Bockkäfer, nebst Bemerkungen über Synonym und geographische Verbreitung. *Ins. Matsumurana* 11(4) :146-149, 1937.—*Olene-camp tus clarus* Pascoe is recorded from China, Formosa, and Korea while five other species are recorded from Formosa, Korea or from both places.

W. E. H.

Mell, R. Beiträge zur Fauna sinica. XIV. Ergänzungen zur Sphingiden-, Brahmaeiden- und Eupterotidenfauna Chinas (Lep.). *Deutsche Ent. Zeitsh.* 1937 (1-2) :1-19, 1 pl., 22 text fig., 1937.—New Sphingidae are described as follows: *Oryambulyx kuangtungensis* *höneli*, *Marumba dyras handelioides*, *Smerinthus minor*, and *Pholidila höneli*. *Calliprionos miraculosa* is described as new in the family Brahmaeidae. *Apona höneli* is described as new in the family Eupterotidae.

W. E. H.

Mell, R. Beiträge zur Lurch- und Kriech-tierfauna Kwangsi's. *Sitzungsber. Ges. Naturforsch. Freunde Berlin* 1929(8-10) :310-332, 1929 (1930).—R. Mell, in the introduction, notes that this report is based upon collections made by S. S. Shin in 1928, and discusses geographical distribution, comparing the Kwangsi fauna with that of neighboring regions. Kwangsi is regarded as a separate province of the east Himalayan region. Its reptilian fauna includes a high percentage (32.3%) of endemic forms. W. Unterstein reports on the tailed amphibians, including *Megalobatrachus maximus*, *Molge labiatum* n. sp., and *Tylocotriton asperimus* n. sp. E. Ahl reports on the tailless amphibians, including *Rana shini* and *Microhyla major*, n. spp., and 7 previously known species. R. MELL reports on 23 species of snakes, including *Tapinophis shini* n. sp., *Holarchus formosanus* f. *violaceoides* and *H. f. form brunnea*, n. forms, *Bungarus fasciatus insularis* n. ssp., and *B. fasciatus* f. *bifasciatus* n. form, and giving measurements and scale counts for all specimens. E. AHL reports on lizards of 8 spp., including *Tachydromus krang-siensis* n. sp., and *Shinisauridae* (n. fam.), based *Shinisaurus* erected for *S. crocodilurus* n. sp. H. Kanberg gives a taxonomic discussion of 3 spp. of turtles.

BIOLOGICAL ABSTRACTS

Merrill, E. D. New or noteworthy Indo-Chinese plants. *Jour. Arn. Arb.* 19(1) :21-70, 3 fig., 1938.—Forty-two new species are described, and about 75 previously described ones are for the first time accredited to Indo-China. About 20 or these represent genera hitherto not recorded from that country.

Merrill, E. D., and Perry, L. M. Reinstatement and revision of *Cleistocalyx* Blume (including *Acacalyptus* A. Gray), a valid genus of the Myrtaceae. *Jour. Arn. Arb.* 18(4) :322-343, 1 pl., 1937.—From the diverse forms of the genus *Eugenia* it is proposed to segregate those species with calyptate calyces, re-establishing the genus *Cleistocalyx* to take care of what is believed to be a "distinct entity worthy of generic rank." The genus is represented by 21 species extending from Chittagong, Burma, Indo-China, Hainan and southeastern China to Sumatra, Java, Borneo, the Philippines, New Guinea, northern Australia, Lord Howe Island, New Caledonia and Fuji. There is a key to species. *C. retinervius* n. sp. is described from Indo-China, *C. conspersipunctatus* n. sp. from Hainan, *C. nigra* (Gagnep.) n. comb. from Cochinchina, *C. operculatus* (Robb.) n. comb. from China and Indo-China.

Merrill, E. D., and Perry, L. M. A synopsis of *Acmena* DC., a valid genus of the Myrtaceae. *Jour. Arn. Arb.* 19(1) :1-20, 1938.—A re-examination of specimens from various collections and of original descriptions leads the authors to regard *Acmena* DC. Prod. as a valid genus with eleven recognized species extending from the Andaman Islands, Tenasserim, Siam, and southeastern China through Malaysia, including the Philippines, to the Solomon Islands, and northern, eastern and southern Australia. Three of the species are described as new and the rest are new combinations.

Miura, Ichiro. Forest and forestry in Taiwan. (In Japanese.) *Jour. Geogr. [Tokyo]* 42(500) :615-621, 4 fig., 1930.

Miwa, Y. An addition to the list of lucanid-species from the Japanese Empire. *Ins. Matsumurana* 3(2-3) :72-76, 2 fig., 1929.—*Neolucanus saundersi* Parry, *Lucanus ferrei* Planet and *Leptinopterus formosanus* n. sp. are reported from Formosa.

FROM BIOLOGICAL ABSTRACTS

Miyake, T., and Koreishi, K. Morphological investigation of the weed seeds in Formosa. (In Japanese with title also in English.) *Formosan Agri Rev.*, No. 374 :50-74; 376, 227-248, 1938

Momiyama, Toku T., and Takizawa, F. A list of the birds collected by Mr. S. Maki in Formosa preserved in the Zoological Institute, College of Science, Kyoto Imperial University. (2) Dicaeidae-Campetherigidae. (3) Muscicapidae-Pittidae. *Annot. Ornith. Orient.* 1(3) :321-338; (4) .339-385, 1928.—Fifteen spp in the Dicaeidae and Campetherigidae, and 37 spp and subsp. belonging to the Muscicapidae, Sylvindae, Timaliidae, Turdidae, Hirundinidae, and Pittidae are noted with synonymy and measurements.

M. U. HACHISUKA in BIOLOGICAL ABSTRACTS

Mori, Tamezo. On the Chiroptera from Korea. *Dobutsugaku Zasshi* 40(477) :284-303, 1 pl., 1928.—Description of 21 species, referable to 3 families. Four species are new.

T. Goda (COURTESY JAP. JOUR. ZOOL.) in BIOLOGICAL ABSTRACTS

Mori, T. [Two new additions to the list of the Japanese birds and three new records for the Korean avifauna.] *Tori* 6(27) :100-108, 1 pl., 4 fig., 1929.—*Iagrurus tetrix koreensis* is described from Korea. *Sturni violacea*, *S. sturnina*, *Oenopelia tranquebarica humilis*, *Pericrocotus tegimae*, and *Nycticorax n. nycticorax* are new to the Korean list.

M. U. HACHISUKA in BIOLOGICAL ABSTRACTS

Moyer, Raymond T. Some observations on the agriculture of Inner Mongolia. *Jour. N. China Branch Roy. Asiatic Soc.* 68 :19-26, 11 fig., 1937.—There is a brief account of cultivated crops and animal husbandry, and of the possibilities for colonization and development of the region.

[**Murav'eva, O. A.**] [A revision of the species forming the genus *Chamaerhodos* Bge.] (In Russian with German summary.) *Bull. Jard. Bot.*

Princ. URSS. 27(1) :30-52, 3 figs., 1928.—This monographic revision, based largely on the herbaria of the Principal Botanical Garden and the Academy of Sciences of S.S.S.R., includes: *C. klementzii* of NE. Mongolia and NW. Manchuria, believed to be a young type, just beginning to become individualized; *C. corymbosa* n. sp. is from Mongolia, Manchuria and the outskirts of Khailar, *C. corymbosa* var. *brevifolia* n. var. from N. China. Synonymy of species and range are discussed.

FROM BIOLOGICAL ABSTRACTS

Murayama, Jozo. Notes sur les Scolytides (Coleoptères) de la Corée. *Tenthredo* 1(4) :367-375, 1937.—The following new forms are described: *Hylurgops modestus*, *Polygraphus horyurensis*, *Xyloterus gaimaensis*, and *Dryocoetes infuscatus*. A new variety, *d*, of *Ips typographus* L. is briefly characterized. Notes are given on six species newly discovered in Korea. Finally there are listed 36 further species of the family Scolytidae (not included in the above categories) making the total of 67 for Korea. W E H.

Musílek, Josef. Záhada stínadí vysvetlena (In Czech) *Leda Přirodní [Prague]* 9(4-5) :112-114, 1928.—Forty years ago a specimen of *Emberiza jankowskii* Tacz. was deposited in the Warsaw Mus. Much speculation had arisen as to the status of the species, some authorities considering it merely an aberration of the Siberian Meadow Bunting, others concluding that *E. jankowskii* was a hybrid between *E. leucocephala* Gmei. or *E. pithyornus* Pall. and *E. c. coides* Brandt. L. Shulpina, a Russian ornithologist, published recently an article on the rediscovery of *E. jankowskii*. Of 10 birds taken recently 4 are in the Zool. Mus. Acad. Sci., Petrograd. The preferred habitat of the bird is on hills covered with tall grass, small bushes, and low oak growth. The nest has not yet been discovered, but it is presumably placed on the ground in grass. The habitat of the species is southernmost Ussuri westward to Manchuria, and according to Shulpina, the northeastern part of Korea and possibly even to the center of Manchuria.

FROM BIOLOGICAL ABSTRACTS

Nakai, Takenoshin. Lespedeza of Japan and Korea. *Rept For. Expt. Sta. Goren Gen Chōsen* 6 :1-101, figs., 1927.—This is a new classification of 27 species of Japanese and Korean Lespedeza belonging to 3 sections. The author has given Japanese and Latin descriptions, photographs, analytical figures, and the habitats of all species and varieties. Included are 8 new species, 7 new varieties, 10 new combinations, and 1 new name.

FROM BIOLOGICAL ABSTRACTS

Nakai, T. Miscellaneous notes on Japanese and Korean plants. *Bot. Mag. [Tokyo]* 40(471) :145-149, 1926.

Nakai, Takenoshin. Notulae ad plantas Japoniae et Koreae. XXIV. *Bot. Mag. [Tokyo]* 41(488) :501-522, 1927.—Many new varieties, new species, and a new section are described. Records are also given of plants new to the Japanese flora.

FROM BIOLOGICAL ABSTRACTS

Nakamura, S. On the jute in the middle and south Formosa. (In Japanese with title also in English.) *Formosan Agric. Rev.* 376 :180-206, 4 figs., 19 tabs., 1938.

Nakayama, M. Notes on the biology of *Monima lizetta* Butl. (In Japanese.) *Inn. Igri Expt. Sta. Korea* 9(1) :87-94, 1 pl., 1937.—This Noctuid, all stages of which are described, and which infests apple in Korea, has one generation a year and overwinters in the pupal stage in the soil. The adults emerge in April, and their average longevity is 27 days. The average number of eggs laid by a female is 196, and the maximum 572; they are deposited in 2 or 3 masses on twigs during the night and hatch in 12 days. The larval stage lasts 24-44 days and there are 6 instars. Collecting the egg-masses and spraying with nicotine sulphate against the larvae are recommended for control.

FROM REV. APPL. ENT.

Nakayama, M. Studies on the biology of *Spilonota lechriaspis* Meyr. (In Japanese with English summary.) *Ann. Agri. Expt. Sta. Korea* 9(1) :70-85, 4 pl., 1937.—Descriptions are given of all stages of this moth, which infests apple, and to a less extent pear, on the western coast of Korea. This Tortricid has 1 or 2 generations annually, the moths occurring from June to August. The larvae spin together the leaves of the young shoots and retard the development of the new twigs; they hibernate, usually in the fourth instar, in a similar shelter of dead leaves. Larvae that complete development in summer do so in 17-46 days. The egg stage lasts 4-6 days and the pupal stage 9-13. Adults live 6-7 days, and the females lay 10-79 eggs on the foliage at night. The larvae are parasitised by three undetermined Braconids. Collect the spun leaves and spraying with lead arsenate or nicotine sulphate are recommended for control.

FROM REV. APPL. ENT.

Nakayama, S. On the food habits of *Ephestia elutella* Hübner. (In Japanese.) *Oyo-Dobuts. Zasshi* 9(3-4) :190-191, 1937.—In Korea, larvae of *Ephestia elutella* Hb., attack tobacco leaves in storehouses, preferring those with considerable moisture of sugar contents, and feed along the mid-ribs from the base. In experiments, they also fed on hulled, but not unhulled, rice.

FROM REV APPL. ENT.

Navás, Longinos. Insectos exóticos neuropteroides y afines del Museo Cívico de Génova. *Ann. Mus. Civ. Storia Nat.* 53:354-389, 20 fig., 1928-1930.—In this systematic list of 70 species of Neuroptera, Mecoptera, and Embioptera, distributional records are given for those previously known. There are many new species including *Cintameva feana* from Formosa.

FROM BIOLOGICAL ABSTRACTS

Navás, Longinos. Insectos del Museo de París. 5. a série. *Brotónia, Ser. Zool.* 26(1) 5-24, 10 fig., 1930.—Two new species of Neuroptera, *Tedula* (n. gen) *sinica* and *Hybris brixi*, are described from China. *Mantispa tonkinensis* n. sp. and *Mantisppila coomani* n. sp. (both Neuroptera), and *Lioheranthus ferrugineus* n. sp. (Ephemeroidea) are from Tongking.

FROM BIOLOGICAL ABSTRACTS

Nicholson, William E. Anthocerotales. *Symbolae sinicae* No. 5, p. 57, 1930.—A report on the 2 Anthocerotales in Handel-Mazzetti's collection of Chinese plants. *Anthoceros laevis* L., from Tonkin, and *A. dichotomus* Raddi, Szechwan, are new records.

BIOLOGICAL ABSTRACTS

Nicholson, W. E. "Atlantic" hepaticae in Yunnan. *Ann. Biologici* 3: 151-153, 1930.—*Jamesoniella carringtonii* Balf., *Scapania nimboosa* Tayl., *Anastrophyllum donianum* (Hook.) Steph., *Anastrepta orcadensis* (Lindb.) Schiffn., *Lepidozia pinnata* (Hook.) Dum., *Mastigophora woodsi* (Hook.) Nees and *Scapania planifolia* (Hook.) Dum., long considered as belonging especially to the flora of the Atlantic coast of Europe occur in Handel-Mazzetti's collection of hepaticae from Yunnan, China. Excepting *A. donianum* and *A. orcadensis*, they lack sexual reproduction; excepting *A. orcadensis* and *S. planifolia* they lack gemmae. This fact, and the widely isolated habitats of these hepaticae indicate that they are relicts from remote antiquity. *Frullania jackii* Gotts., a plant of eastern and central Europe, sterile in Europe, occurs in Yunnan, where it bears capsules. Yunnan is regarded as nearer the original home of these hepaticae than Europe.

BIOLOGICAL ABSTRACTS

Nicholson, William E. Jungermanniales anacrogynae. *Symbolae sinicae* No. 5, p. 7-9, 1930.—A report on the Jungermanniales anacrogynae in Handel-Mazzetti's collection of Chinese plants. New for China: (Aneuraceae) *Aneura pinguis* (L.) Dum., Yunnan; *Metzgeria furcata* (L.) Dum., Hunan; *M. conjugata* Lindbg., Yunnan; *M. hamata* Lindbg., Yunnan; (Blyttiacaeae) *Pallavicinia indica* Schiffn., Hunan; *Makinoa crispatula* (Steph.) Miyake; (Coccomiaceae) *Peltia fabroniana* Raddi, Szechwan; *Fossumbroria levieri* Steph., Szechwan.

BIOLOGICAL ABSTRACTS

Nicholson, William E., Verdoorn, Frans, und Herzog, Theodor. Jungermanniales acrogynae. *Symbolae Sinicae* No. 5, p. 9-57, 1 pl., 19 fig., 1930.—In this treatment of the Jungermanniales acrogynae in Handel-Mazzetti's collection of Chinese plants, the sections on the Lophoziaceae (except *Plagiochila*), on the Trigonanthaceae, on the Ptilidiaceae, on the Scapaniaceae, Radulaceae, and Porellaceae, are contributed by W. E. Nicholson; that on Lejeuneaceae, Frullaniaceae, by Frans Verdoorn; and those on *Plagiochila* and on the Lejeuneaceae, Lejeuneoeeae, by Theodor Herzog. There are descriptions of one new genus, one new subgenus, 37 new species, 6 new varieties and 4 new forms. Many new distribution records are given.

FROM BIOLOGICAL ABSTRACTS

Nixon, G. E. J. Some Asiatic Telenominae (Hym., Proctotrupidae). *Ann. & Mag. Nat. Hist.* (10) 20(118):444-475, 12 fig., 1937.—Descriptions are given of 16 egg-parasites of the genus *Telenomus*, 12 of which are new. The latter include *T. (P.) dignus* Gah, which is recorded as a parasite of eggs of *Schoenobius bipunctifer* Wlk., in China.

FROM REV. APPL. ENT.

Nolla, J. A. B. Inheritance in *Nicotiana* III. A study of the character for mosaic resistance in *Nicotiana tabacum* L. *Jour. Heredity* 29(1):43-48, 3 fig., 3 tab., 1938.—In crosses between mosaic-susceptible and mosaic-resistant varieties of tobacco, the F₁ generation is susceptible, indicating recessiveness of the resistant character. On the basis of evidence from F₂, F₃ and backcross progenies of crosses between resistant and susceptible varieties, it is concluded that duplicate factors are responsible for the mechanism of inheritance of susceptibility and resistance to mosaic. Resistance results only when the two factors are the recessive condition. The duplicate factors are designated by the formula F_{m1R_{m1}}R_{m2R_{m2}}.

AUTHOR'S SUMMARY

Obolenskij, S. A preliminary review of the palaearctic souslik (*Citellus* and *Spermophilopsis*). *Compt. Rend. Acad. Sci. URSS Ser. A* 12:188-193, 1927.—Studies were made of some 1200 specimens, chiefly in the Zool. Mus. Acad. Sci. USSR, and notes are given on the morphology, distribution, and distinctive characters of the 18 species represented. *Citellus eversmanni stramineus* is a new subspecies from NW. Mongolia.

FROM BIOLOGICAL ABSTRACTS

Odhner, Nils Hj. Eikapseln von *Hemifusus colosseus* Lamarck. *Arch. f. Molluskenk.* 59(6):355-357, 1 pl., 1927.—Examples are cited from China of the egg capsules of *H. colosseus*.

FROM BIOLOGICAL ABSTRACTS

[**Ognev, S. I.**] [New data on the systematics and the geographical distribution of some species of the Mustelidae.] *Mém. Sect. Zool. Soc. Amis Sci. Nat. Anthropol. Ethnogr.* Moscow 2:5-30, 1928.—Representatives of several mustelid genera inhabiting Russian territory are here reviewed, including *Mustela erminea mongolica* from Mongolia.

FROM BIOLOGICAL ABSTRACTS

Ohki, K. On the polygonaceous plants of Manchuria. *Bot. Mag. [Tokyo]* 41(485):410-411, 1927.—A list of 15 species with annotations in Japanese.

BIOLOGICAL ABSTRACTS

Ohta, Y. Beitrag zur Kenntnis der Helotiden-Fauna von Japan, Korea und Formosa. *Ins. Matsumurana* 3(2-3):108-110, 1929.—A key is given to the species of *Helota*, with a list of the species and forms. *H. seae ab. mushana* is from Formosa.

FROM BIOLOGICAL ABSTRACTS

Ohta, Yuai. Beitrag zur Kenntnis der Ptiniden Japans. *Ins. Matsumurana* 4(3):105-109, 1 fig., 1930.—An annotated list is given of the

Japanese species, with keys to the subfamilies, genera, and species. *Ptinus kuronis* n. sp. is from Formosa.

FROM BIOLOGICAL ABSTRACTS

Ohta, Yuai. Einige neue Heidotiden- und Coccinelliden-Arten aus Formosa. *Ins. Matsumurana* 4(1-2):66-70, 1 fig., 1929.—Seven new species are listed from Formosa. They include *Neohelota* (n. gen.) *tumaka*.

FROM BIOLOGICAL ABSTRACTS

Ohta, Yuai. Scymninen Japans. *Ins. Matsumurana* 4(1-2):1-16, 1929.—From Formosa are described *Paraclitostethus* (n. gen.) *ovatus* n. sp., 5 other new species, 1 new variety and 6 new aberrations

FROM BIOLOGICAL ABSTRACTS

Ohwi, Jisaburo. Symbolae ad floram Asiae Orientalis 15. (In Latin with Japanese summary.) *Acta Phytotax. Geobot.* 6(3):145-153, 1937.—Fourteen species are treated in this section of the series, including 7 new species, 3 new combinations and 1 new name. Three of the species are from Formosa, 1 from Manchuria and China, 2 from Korea. Corrections are given for previous papers of the series.

Ohwi, Jisaburo. Symbolae ad floram Asiae Orientalis 16 (In English with Japanese summary.) *Acta Phytotax. Geobot.* 7(1):29-41, 1938.—Eighteen species with their forms and varieties are treated. Two species are reported from Formosa and 5 from Korea.

Okada, Ichiji. Mitteilungen über einige Nematoceren aus der Mandschurei (Diptera). *Ins. Matsumurana* 12(2-3):136-142, 2 text fig., 1938.—Seven species (two new) belonging to the old family Fungivoridae, one species belonging to Bibionidae, and one to the family Tanyderidae, are recorded for Manchuria. The new species are *Neoempheria ornata* and *Iew pilosa*. W. E. H.

Ong, T. T. [Conversion of experimental yield into Chinese units] *Jour. Agri. Assoc. China* 72:77-78, 1930.

Orchymont, A. d'. Contribution à l'étude des Hydrophilidae 5 & 6. *Bull. & Ann. Soc. Ent. Belgique* 63(1-2):91-106; (5):201-248, 1926.—*Helophorus kingstoni*, *H. splendidus* f. *imensis*, *H. montanus* and *Laceobius kingstoni* are new and are from Tibet. New species from Indo-China are *Pseudocerryon* (n. gen.) *andrewesi*, *Pachysternum coomani*, *Cryptopleurum coomani* and *Amphiops coomani*. Many other oriental species are described

FROM BIOLOGICAL ABSTRACTS

Orchymont, A. d'. Contribution à l'étude des Palpicornia 7 *Bull. & Ann. Soc. Ent. Belgique* 69(3):79-96, 1 pl., 1929.—Taxonomic notes are given for various species. *Psaltrus sauteri* n. sp. is described from Formosa

FROM BIOLOGICAL ABSTRACTS

Osborn, Henry Fairfield. *Amynodon mongoliensis* from the Upper Eocene of Mongolia. *Amer. Mus. Novitates*, No. 859, 5 p., 6 fig., 1936.—A fossil rhinoceros, *Amynodon mongoliensis* is described as new from the Upper Eocene Horizon of Mongolia. The new species has its closest resemblances with *A. intermedius* Osborn from the Uinta of Utah. W. E. H.

Otto, J. H. F. Über den chinesischen Leberegel *Opisthorchis sinensis*. Zur Entstehung, Erkennung und Behandlung der durch ihn bedingten Krankheit. *Arch. F. Schiffs- u. Tropen-Hyg.* 41(7):481-505; (8):522-565, 1937.—Otto's review of clonorchiasis deals with the life-history of the parasite, listing the 1st and 2nd intermediaries, the incidence of the disease in Canton Province, its pathology, clinical diagnosis, and treatment. The review closes with 8 closely printed pages of references

B. G. P. in HELMINTH ABST. FOR 1937

Pampanini, R. Quarto contributo alla conoscenza dell' "Artemisia verlotorum" Lamotte. *Nuovo Giorn. Bot. Ital.* 34(1) :171-181, 1 fig., 1927.—Differentiating characters and origins of the species of this group are briefly discussed. Foliage and corollas are illustrated. Several new species, varieties and forms are treated. FROM BIOLOGICAL ABSTRACTS

Pan, C. Y. [A study of soil classification and the question of soil survey in China.] *Jour. Agric. Assoc. China* 72 :15-56, 1930.

Paramonow, S. J. Beiträge zur Monographie der Gattung Exoprosopa. *Acad. Sci. Ukraine Mém. Cl. Sci. Phys. et Math., Trav. Mus. Zool.* 4, 6(2) :181-300, 6 pl., 3 fig., 1928.—The author submits to a critique the series of subgenera recognized by Bezzi, preferring to recognize species groups designated by the species respectively characteristic. The author regards *Litorrhynchus* as inadequately distinguished from *Exoprosopa*. A key is given to the Palearctic species of the genus, followed by detailed descriptions. Many new species are included. FROM BIOLOGICAL ABSTRACTS

Parker, L. B. Seven new species of Asiatic *Tiphia*. *Jour. New York Ent. Soc.* 45(3-4) :269-290, 1937.—Descriptions are given of both sexes of 7 species of *Tiphia* collected in Japan and Korea in connection with the export of Scoliids to New Jersey for the control of *Popillia japonica* Newm. Keys to the males and females are given, and also a table showing the position that the species would occupy in the key of Allen & Jaynes.

REV. APPL. ENT.

Peacock, W. H. League of Nations: Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene. *Bull. Hyg.* 12(12) :817-829, 1937.—"With a view to preparing for an Intergovernmental Conference on Rural Hygiene convened by the League of Nations, at Bandoeung (Netherlands Indies) on August 3rd, 1937, the various countries invited to send representatives to the Conference were asked to communicate a national report covering the items of the agenda of the Conference, which were as follows: I Health and Medical Services. II. Rural Reconstruction and Collaboration of the Population III. Sanitation and Sanitary Engineering IV. Nutrition V. Measures for combating certain diseases in Rural Districts." Twelve reports submitted are here reviewed. In addition to the report of the preparatory committee, there are reports from French Indo-China, Burma, British India, Malaya, Ceylon, Philippines, China, Japan, Siam, Hong Kong, North Borneo and other British colonies in the Pacific islands, Netherlands Indies. In China a Ministry of Health was established in 1928. Nine of the 18 provinces have health administrations with over 200 rural health units. Attempts are being made to introduce sanitation, procure reliable vital statistics and improve maternal and child health. Deficiency diseases and smallpox are very common. Malaria is prevalent over eastern and southern China, especially in the rice-growing districts. There are occasional outbreaks of plague and leprosy is very prevalent. There are at least a million lepers, mostly in the villages.

P'ei, Chien, 裴堅 An enumeration of verbenaceous plants from Yunnan, collected by H. T. Tsai, during the year 1933-34. (In English with Chinese abstract) *Bull. Fin Mem. Inst. Biol. (Bot.)* 7(4) :145-151, 1936.—Fifty-four plants, representing 13 species in 7 genera, were studied. Distribution notes are given for each species.

Pereira, R. A. Chinese domesticated ducks. *Hong Kong Nat.* 8(3-4) :159-165, 1 pl., 1938.—Descriptive notes are given on the 4 varieties of ducks found in the New Territories, the *Ng chow* which has a white breast, the *Arp na* which is probably the descendant of domesticated mallards, the *Nai arp*, a hybrid with Muscovy characteristics predominating, the *Faan arp* or Muscovy duck. The flesh of the 4 varieties is compared. Several popular dishes prepared with duck are described.

Pesta, Otto. *Handeliella* Brehm 1924 = *Harpacticella* G. O. Sars 1908 (Copepoda Harpacticoida). *Zool. Anz.* 88(5-6) :132-138, 3 fig., 1930.—From a study of the Chinese collections from which type material of *Handeliella paradoxa* was taken, the author concludes that the species properly belongs to *Harpacticella* G. O. Sars. Hence, *Harpacticella paradoxa* replaces *Handeliella paradoxa* Brehm.

BIOLOGICAL ABSTRACTS

Peter-Stibal, Elfriede, 彼得夫人. *Zwei neue Labiaten von Yunnan.* (In German with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(1) :53-55, 1937.—*Salvia Tsaiana* n. sp. and *Orthosiphon wulfenioides* (Diels) Hand.Mzt. var. *foliosus* n. var. are described.

Pic, M. Coléoptères exotiques nouveaux ou peu connus. *Bull. Soc. Zool. France* 54 :43-46, 1929.—Three new species and two new varieties are from Indo-China. *Demotina piceonotata* and *D. multinotata*, n. spp., are from China.

FROM BIOLOGICAL ABSTRACTS

Pic, M. Contribution à l'étude du genre *Pseudometaris* Jac. *Bull. Soc. Zool. France* 54 :140-141, 1929.—A key is given to 11 of the 12 species of this Asiatic and East Indian genus. *P. robustus* n. sp. is from Tonkin; *P. bicoloripes* n. sp. and *P. b.* var. *reductus* n. var. are from Yunnan.

BIOLOGICAL ABSTRACTS

Pic, Maurice. Nouveautés diverses. *Mélanges Exotico-Ent.* 52 :1-32, 1928.—Many new species are included from the Indo-Australasian region. *Phymatopoderus monstruosus* is from Shanghai; *Phaeochrous rufus*, *Borborethes castaneus* and *Acrothinium cyaneipes* from China; *Oberea taliana* v. *brevelineata* and *Corynodes purpureipennis* from Yunnan.

FROM BIOLOGICAL ABSTRACTS

Pillsbury, A. F., and Compton, O. C. A fruit circumeter. *Calif. Citrog.* 22 :151, 156, 1937.—An instrument for measuring the circumference of fruit, called a "circumeter", is described. It is said to surpass calipers or tape measure for this purpose.

W. E. H.

Ping, C. On the fossil terrestrial gastropods of Chingshing and Chou Kou Tien, Hopei Province. *Geol. Surv. China Palaeontol. Sinica* B 6(5) :5-25, 2 pl., 14 fig., 1929.—Six species (5 new) are described from the supposed Hippurion red clay (Lower Pliocene) of Chingshing. Nine species (7 new) are from the Polycene formation of Chou Kou Tien. The specimens from the first-mentioned area are decidedly older than those from the other area.

FROM BIOLOGICAL ABSTRACTS

Plavilstshikov, N. N. Énumération des coléoptères recueillis par M. A. V. Martynov dans la Mandchourie. *Wiener Ent. Zeitung* 45(4) :154-157, 1928.—A list of 70 species of which 5 are new to Manchuria and one, *Graphodes adamsi* Clark., is new to Asia.

BIOLOGICAL ABSTRACTS

Plavilstshikov, N. N. Liste der von Herrn A. Alexandrov in der Mandschurei gesammelten Cerambyciden (Coleoptera). *Ent. Nachrichtenblatt* 4(2) :55-57, 1920.—A list of 46 species of Cerambycidae collected in Manchuria.

BIOLOGICAL ABSTRACTS

Pleske, Th. Description d'une espèce nouvelle du genre *Eualia* (Diptera, Stratiomyidae), provenant de la Corée. *Compt. Rend. Acad. Sci. URSS. Sér. A* 18-19 :359-360, 1928.—*E. (Zoniomyia) coreana* is described from Korea.

FROM BIOLOGICAL ABSTRACTS

Pohl, Lucien. Louis Boutan (1859-1934). *Notes, Inst. Oceanog. l'Indochine*, No. 31 :7-14, 1936.—Biography of Louis Boutan, pioneer in marine zoological research in Indochina.

Popov, V. B., and Giulia, D. Note sopra i gen. *Ctenoplectra* Sin. e *Macropis* Panz. (Hymenoptera, Apidae). *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 59 (14-16) :275-288, 5 fig., 1935-1937.—*Ctenoplectra Cockrelli* Popov n. sp. is described from Szechwan. A taxonomic diagnosis is given of the two genera.

Portenko, L. Über den taxonomischen Wert der Formen der palaearktischen Bussarde. *Bull. Acad. Sci. URSS, Cl. Sci. Physico-Math.* 1929 (7) :623-652, map, 1 pl., 2 fig., 1929.—Systematic review of the Palaearctic forms of *Buteo*, with key, and with special discussion of color phases and individual variation. *B. japonicus saturatus* n. ssp. is from Tibet (type), China, and India. BIOLOGICAL ABSTRACTS

Prescott, R. T. M. The Leaf-eating Ladybird (*Epilachna vigintioctopunctata* Fab.) *Jour. Dept. Agric.* 35 (6) :296-292, 7 fig., 1937.—This species occurs in China, Ceylon, Fiji, India, Japan, Malaya, P.I., and in the warmer parts of Australia. Recently it has extended its range into colder parts of Australia. In Victoria it is serious on potato but also feeds on tomato and various wild Solanaceae including *Solanum nigrum*. This utilization of wild plants as hosts complicates control in Victoria just as it does here in South China, where *S. nigrum* serves as the chief host. Elsewhere in Australia this species feeds on melons, pumpkins, cotton, and other plants. There are two complete generations in Victoria. All of these stages are figured. The life history of this species in China was recounted in *Ling. Sci. Jour.* 6 (4) :301-313, 4 tab., 2 pl., 1928. W. E. H.

Rachow, Arthur. *Channa asiatica* (Linne). (Mit einer Originalzeichnung von Fritz Maner.) *Blätter f. Aquarien- u. Terrarienk.* 41 (1) :1-2, 1 pl., 1930.—Notes on this S. China species as an aquarium fish, with a figure. BIOLOGICAL ABSTRACTS

Rahm, Gilbert. The concept life and death in modern biology. *Peking Nat. Hist. Bull.* 11 (4) :381-393, 1937.—A review of recent research on the biology of life and death.

Rahm, G. Frei lebende Nematoden vom Yan-Chia-Ping-Tal (Nordchina). *Zool. Anz.* 119 (3-4) :87-97, 1937.—Rahm has collected and identified a number of free-living nematodes from mosses in north China. In addition to a number of well-known forms, the following are described as new: *Dorylaimus puchaussuensis* n. sp., *Hoplolaimus sinensis* n. sp. and *Anguillulina yanchiapensis* n. sp. T. G. in HELMINTH. ABST. FOR 1937.

Read, Bernard E. Contributions to natural history from the cultural contacts of east and west. *Peking Soc. Nat. Hist. Bull.* 4 (1) :57-76, map, 1 pl., 1929.—A study of old Chinese herbals shows that from 3000 B.C. to 1600 A.D. the Chinese expanded their knowledge and use of plants from 250 to 816 vegetable drugs. India shows a similar increase in her knowledge and use of natural history objects. From or through Persia there came to China the grape, alfalfa, walnut, coriander, pepper, cucumber, carrot, and many others amounting to about 135. From China to the west there were sent the peach, apricot, ginger, rhubarb, tea, cinnamon, saltpetre (Chinese snow), and kaolin. In the 7th and 8th centuries contacts with Arabia and the Moslems brought to China various alliums and fennel; and southern countries brought madder and cutch. In India and China there are materials from about 211 identical sources. Another 268 drugs used in both countries are different spp. of the same genus, their use in most cases being obviously of a common cultural origin. In the case of many other drugs such as chaulmoogra, even the genus is different but their use probably comes from one cultural source. Laboratory work is essential to bibliographic research in establishing the facts of man's cultural influence upon natural history.

B. E. READ in BIOLOGICAL ABSTRACTS

Rehder, Alfred. New species, varieties and combinations from the herbarium and the collections of the Arnold Arboretum. *Jour. Arn. Arb.* 19(1) :71-87, 2 pl., 1938.—Thirty species and varieties are treated. Many new combinations are made. The new species *Ostrya multinervis* n. sp. is from Hunan.

Rehder, Alfred. Notes on the ligneous plants described by H. Léveillé from eastern Asia. *Jour. Arn. Arb.* 18(4) :273-321, 1937.—Additions and corrections are given on 29 species. This series is concluded with this paper. An index of all Léveillé's names mentioned in the series is given. The majority of these names proved to be synonyms and these are followed by the name considered correct with reference to the page or pages of Vols 10-18 of this Journal where the identification was published or additional information given.

Reichardt, A. De Histridis (Coleoptera) novis faunae palaeoarcticae. *Ann. Mus. Zool. Acad. Sci. URSS.* 30(2) :285-304, 18 fig., 1929.—A number of new species are described from Siberia, Turkestan and Russia. *Saprinus graculus* n. sp. occurs in Mongolia. FROM BIOLOGICAL ABSTRACTS

Reinig, W. F. Beitrag zur Kenntnis der Hummelfauna von Mandschukuo (Hym., Apid.). *Mitteil. Deut. Ent. Gesell.* 7(1) :2-10, 1936.—Fifteen species and subspecies are described. The following are new to science: *Bombus (Subteirano-bombus) alinae*, B. (*Agrobombus*) *wustneii* ssp. *chinganensis*, B. *sieheli* ssp. *chinganensis*, B. (*Bombus*) *patagiatus* ssp. *albopilosus*, B. (*Hortobombus*) *consobrinus* ssp. *alini*, *Psithyrus (Ashtonipsithyrus) chinganicus*, P. (*Allotrophiurus*) *richardsi* ssp. *leucopygus*.

Richards, O. W. A revision of the European bees allied to *Psithyrus quadricolor*, Lepeletier (Hymenoptera, Bombidae). *Trans. Ent. Soc. London* 76(2) :345-365, 1 pl., 1928.—Included is *Psithyrus shorkori* v. *mesoranthus* n. var. from Tibet. FROM BIOLOGICAL ABSTRACTS

Riley, J. H. A new wren of the genus *Spelaeornis* from Yunnan, China. *Proc. Biol. Soc. Washington* 42 :213-214, 1929.—*S. rocki* n. sp.; type in U. S. Nat. Mus. · BIOLOGICAL ABSTRACTS

Rohdendorf, B. Beiträge zur Kenntnis der *Salmacia* (Gomphidae) Gruppe. (Diptera, Tachinidae.) *Zool. Anz.* 78(5-8) :97-102, 1 fig., 1928.—Included are *Salmacia dirisa* ssp. *manshanica* from E. China and ssp. *turkestanica* from Turkestan. FROM BIOLOGICAL ABSTRACTS

Rohdendorf, B. Miltogrammen-Studien. IV. *Zool. Anz.* 71(5-8) :157-169, 10 fig., 1927.—Five species are described from Turkestan. *Apodacra poeciloptera* and *A. similis* are from Mongolia. FROM BIOLOGICAL ABSTRACTS

Sah, F. K. Rehabilitation of the Canton-Hankow railway. *Far Eastern Rev.* 33(8) :313-316, 319, 8 fig., 1937.—A short history of the construction of the railway with details of the methods being used for repair of the line.

Schauberger, E. Neue indo-malayische Harpalinen des Deutschen Entomologischen Instituts Berlin-Dahlem. *Ab. morph. taxon. Ent. Berlin-Dahlem* 5(1) :37-54, 1938.—*Lamprophonus cibripennis*, *Acupalpus (Anthracus) guttiger*, and *Anoplogenius Horni* are described as new from Indochina. W. E. H.

Schilder, F. A. The Gisortidae of the world. *Proc. Malacol. Soc. London* 19(3) :118-138, 2 pl., 1930.—The new family Gisortidae, an extinct family confined to the Up. Cretaceous and Eocene, is proposed for *Megalocyproea*, *Vicetia*, and *Gisoria*. Among new species included in the family is *Gisoria taiwanensis* from the Formosan Tertiary.

FROM BIOLOGICAL ABSTRACTS

Schmidt, K. Eine neue *Sehirus*-Art aus dem Mittel-meergebiet. (Hein. Heteropt., Cydn.). *Deutsche Ent. Zeitschr.* 1936 (1-2) :47-53, 1 text fig., 1936.—A new species is described from Mt. Atlas, Morocco, and a key given to the fifteen palearctic species including *Sehirus niveimarginatus* Scott which occurs in China. W. E. H.

Schönwetter, M. Vogeler aus Kansu. *Jour. Ornithol. [Berlin]* 77 (1) :35-40, 1929.—The location and materials of the nests and the color and measurements of the eggs of 17 species (chiefly Passeres) are described. Localities and dates are given.

BIOLOGICAL ABSTRACTS

Seki, Fumihiko. Forestry in Taiwan. (In Japanese.) *Jour. Geogr. [Tokyo]* 42 (400) :532-536, 1930.

Serebrennikov, M. Review of the beavers of the Palearctic region. *Compt. Rend. Acad. Sci. URSS. A.* 1929 (11) .271-276, 2 fig., 1929.—Beavers, which had a wide distribution during the quaternary period, are now represented by 3 North American species and 5 Palearctic forms elsewhere, including *Castor fiber birulai* n. ssp. from the Mongolian Altai.

FROM BIOLOGICAL ABSTRACTS

Serebrovskij, P. New races of Palearctic birds. *Compt. Rend. Acad. Sci. URSS Sér. A.* 20 .325-326, 1927.—*Carpodacus trifasciatus primutinus* n. ssp. is from China; *Monticola satiatus centralasiae* n. ssp., from Mongolia and Turkestan; *Laiscopus collaris herezowskii* n. ssp. from China; *Ianthocincla maxima khamensis* n. ssp. from Tibet.

FROM BIOLOGICAL ABSTRACTS

Serène, R. Inventaire des Invertébrés marins de l'Indochine (tre hste) *Notes*, Inst. Océanog. l'Indochine No. 30, 83 p., 1937.—There is a list arranged in systematic order of 59 Protozoa, 212 Coelenterata, 40 Echinodermata, 56 Vermes, 27 Vermidea, 694 Mollusca, 258 Crustacea, *Limulus*, 37 Prochordata. Thirty-three references are included.

Serène, R. Rapport sur le fonctionnement de l'Institut Océanographique de l'Indochine pendant l'année 1935-1936. *Notes*, Inst. Océanog. l'Indochine, No. 32 :1-22, 7 pl., 10 tab., 1936.

Seward, Albert C. The story of the maidenhair tree. *Sci. Prog.* 32 (127) : 420-440, 2 fig., 1938.—The story of the Maidenhair Tree, as told by the paleontologist, is something like an iceberg—it is much bigger than it seems on the surface. And like the iceberg, the Maidenhair Tree has a long history embracing numerous connections not obvious to, or suspected by, the casual observer. There is a great deal more in the present article than the average person is likely to expect from the title. And while there is much in this story that will fascinate the general reader, a full appreciation and comprehension of its treasures requires a background of knowledge in plant morphology, paleobotany and geology. It is written by a scientist uniquely qualified to paint a picture of the life, relationships and environment of this tree during a period of vast antiquity, when it was surrounded by a sizable family of related species and genera, and ranged far and wide in all quarters of the globe. "Ginkgo is one of a small company of living plants which illustrates continuity and exceptional power of endurance in a changing world." A map of the distribution of *Ginkgo* and allied genera in former periods shows that fossil remains have been found on every one of the continents. The author's diagram illustrating the approximate distribution, in time, of the genera of the Ginkgoales, shows 14 genera, spanning, in aggregate, a period of some 180 million years previous to the emergence of man, about a million years ago. The Maidenhair Tree, *Ginkgo biloba* L., the sole survivor of this ancient family, is represented in the rocks of various periods by leaves and fruits which are generically, if not specifically, identical with

it, and which represent a time range of nearly 280 million years, a world-wide geographical range, and a climatic range probably much greater than that which it now enjoys. "There can be no doubt that China was the last, if it is not the present, natural home of the Maidenhair tree." The details concerning the structures which link the Maidenhair Tree, in one way and another, to living forms, will be especially useful to undergraduate students of morphology.

F. A. McCCLURE

Shaw, Tsen-Hwang. 雜錄黃. *Notulae circa sinensis Aves.* (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol.* (Zool.) 7(3): 187-198, 1 fig., 1 tab., 1937.—A series of short notes is presented. (1) Egg-weight and body-weight in some Chinese birds. Based on a study of *Izobrychus sinensis* (Gmelin), 4 Gruiformes, *Rostratula benghalensis benghalensis* (I.), *Alcedo atthis bengalensis* Gmelin, and 8 Passeriformes, it was found that the relative egg-weight diminishes with increase of the absolute body-weight, and this decrease of relative egg-weight follows some definite rule in relation to absolute body-weight. (2) The nidification of three Hopei birds. Nests of *Pica pica sericea* Gould, *Cyanopica cyana interposita* Hartert, and *Chloris sinica sinica* (L.) are described. (3) Additional remarks on the so-called gray-headed wagtail. The length of the hind claw varied from 9.5 mm. to 12.8 mm. in 37 specimens. Fifteen specimens had no superciliary streak. (4) Pei Hai park visited by pelican. Pelicans are occasional summer visitors at this Peiping park. (5) On the tongue of mute swan. The tongue is described and figured.

Shen, C. J. 沈嘉瑞. Description of a new tube-dwelling amphipod collected on the coast of Shantung Peninsula. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 6(6): 265-273, 5 fig., 1 tab., 1936.—*Cerapus longirostris* n. sp., closely related to *C. tubularis* Say, is described and figured in detail.

Shen, Chia-Jui. 沈嘉瑞. The fresh-water Isopods of Peiping. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(1): 1-31, 4 pl., 4 text fig., 1936.—This fauna of China is imperfectly known. Five species have been found, one free-living and four parasites of fishes and shrimps. Each is described in detail. *Livoneca parasilura* n. sp. is a parasite of a catfish, *Parasilurus asotus* (Linn.); *Ichthyoxenus sinensis* n. sp. is parasitic in *Carassius auratus* L.; *I. geei* Boone was found free-swimming and in the body cavity of fish; *Tachaea chinensis* Thielemann is usually found on the cephalothorax of freshwater shrimps; *Asellus aquaticus* (L.) is found swimming in ponds.

Shen, Chia-Jui. 沈嘉瑞. Notes on the genus *Polyonyx* (Porcellanidae) with description of a new species. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 6(6): 275-287, 2 fig., 1936.—Of the 21 species of *Polyonyx* previously known, only one, *P. sinensis* Stimpson, has been found on the Chinese coast. A new species, described as *P. asiaticus*, is here reported from Chefoo, Shantung Peninsula. It is probably a commensal in the tube of *Chaetopterus*.

Shen, C. J. 沈嘉瑞. On some account of the crabs of north China. (In English with Chinsee abstract.) *Bull. Fan Mem. Inst. Biol.* 7(5): 167-185, 1937.—In previous papers the author has described the Brachyuran fauna of the Liaotung Peninsula to the Shantung Peninsula. A total of 85 species is represented, 24 of them very rare and new to science, 17 recorded for the first time from Chinese waters and 44 hitherto known only from South China. A general review is given of these species, with habit notes and distinguishing characteristics of related forms.

Sheriff, G. Migration notes from Kashgar, Chinese Turkistan. *Jour. Bombay Nat. Hist. Soc.* 33(4): 989-990, 1929.—Nine species are mentioned

BIOLOGICAL ABSTRACTS

Sheriffs, W. Rae. Hong Kong spiders. Part IV. *Hong Kong Nat.* 8(3-4) :178-185, 1 pl., 4 fig., 1938.—Four species are described and figured: *Sipalolasma* sp.? (Barychelidae), *Thalassius phipsoni* F. Cambr. (Pisauridae), *Dolomedes* sp.? (Pisauridae), *Thelecticopis* sp.? (Clubionidae).

Shih, H. J., 施懷仁. Mandarin fishes from Szechuan with descriptions of new species. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(3) :119-129, 2 fig., 1937.—Six species and subspecies are represented in the small collection of specimens studied. *Siniperca szechuanensis*, allied to *S. chui* and *S. chieni* Fang & Chong, and *S. schezeri kichuani* are described as new. Distribution records and measurements are given for *S. chuatsi* (Basilewsky), *S. c. bergi* Fang & Chong, *S. knerii* Garman, and *S. chui* Fang & Chong.

Shih, H. J., 施懷仁. Notes on the labyrinth fishes of China. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(2) :67-97, 7 fig., 6 tab., 1937.—Eight species belonging to two suborders (Ophiocephaloidea and Anabantoidea) of Labyrinthici are discussed. For each species bibliographical references, measurements, and distribution records are given. The species included are: *Channa asiaticus* (L.), *C. yachua* (H-B), *C. maculatus* Lacepede, *C. argus* (Cantor), *C. argus kinurai* n. ssp., *Aunopus testudineus* (Bloch), *Macropodus chinensis* (Bloch), *M. opercularis* (L.).

Shiraki, T. *Hispa similis* Uhmann, a pest of the rice plant peculiar to Formosa. (In Japanese.) *Agric. & Hort.* 12(8) :2153-2160, 8 fig., 1937.

Shiraki, T. Orthoptera of the Japanese Empire. Part 1. (Gryllo-talpidae and Gryllidae.) *Ins. Matsumurana* 4(4) :181-252, 24 fig., 1930.—Keys to the Japanese subfamilies, genera, and species are given, with a list of all the species. Many new species are described from Formosa, one each from Manchuria and Korea.

FROM BIOLOGICAL ABSTRACTS

Sicard, A. Descriptions d'espèces et variétés nouvelles de Coccoïnélidés appartenant au genre *Caria* Mls. *Ann. Soc. Ent. France* 98(1-2) :188-192, 1929.—Included is *Caria major* ab. *yunnana* n. ab. from Yunnan.

FROM BIOLOGICAL ABSTRACTS

Simpson, George Gaylord. Horses and history. *Nat. Hist.* 38(4) :277-288, 2 pl., 19 fig., 1936.—A brief account of the place of the horse in world history, including that in the Mongolian civilization.

Singh, B. N., Chakravarti, S. C., and Kapoor, G. P. An inter-specific *Hibiscus* hybrid. *Jour. Heredity* 29(1) :37-41, 4 fig., 1 tab., 1938.—Between *H. ficulneus* and *H. esculentus*. Hybrid plants are figured and described.

Skvortzow, B. W. Einige neue und wenig bekannte Chlamydomonadaceae aus Manchuria. *Arch. Protistenk.* 66(1) :160-165, 15 fig., 1929.—An annotated list of 25 species including 11 new species, 3 new varieties, and one new combination.

FROM BIOLOGICAL ABSTRACTS

Skvortzow, B. W. Über einige Süsswasseralgen aus der Nord-Mandschurei, im Jahre 1916 gesammelt. *Arch. Hydrobiol.* 16(3) :421-436, 8 fig., 1926.—A tabulation of 262 forms of algae determined in samples from 6 localities, mostly in the vicinity of Charbin. *Oedogonium manschurianum* and *Trachelomonas curvifolia* with var. *ovata* are new.

W. C. MUENSCHER in BIOLOGICAL ABSTRACTS

[**Skvortsov, B. V.**] Study of wild fruit plants of the Far East. (In Russian with English summary.) *Bull. Appl. Bot. Gen. & Plant Breed.* 22(3) :203-239, 16 fig., 1929.—(1) Two kinds of hazel nuts, grown in

N. Manchuria are described and 4 new forms are proposed: *Corylus heterophylla* f. *cordata*, f. *cuneata*, f. *acuminata*, and f. *irregularis*. (2) The wild strawberry, *Fragaria orientalis*, is mentioned growing in N. Manchuria. The new forms f. *paludosa* and f. *oblonga* are described. (3) Three species of apricot grow in Kirin and Holungkung Province of N. Manchuria; these are described. New to science are: *Armeniaca sibirica* f. *typica*, f. *abrupta*, and f. *microcarpa*, A. *manshurica* var. *subcordata* and var. *domestica*. (4) The author describes 7 species of *Cerasus* growing wild and cultivated in the Chinese part of North Manchuria. *C. tomentosa* f. *oblonga* and *C. japonica* var. *engleri* f. *albiflora* are new.

FROM BIOLOGICAL ABSTRACTS

Skvortzov, B. V. Subaerial diatoms from Hanchow, Chekiang Province, China. (In English with Chinese abstract.) *Bull. Fan Mem Inst. Biol. (Bot.)* 7(4):219-230, 1 pl., 1937.—Twenty-four diatoms were found in a sample of mosses from a rock in a cave near Hangchow. *Frustulia vulgaris* var. *muscosa*, *Stauroneis parvula* var. *rupestris*, *Navicula Kovalchookiana*, *N. hangchowensis*, and *Cymbella muralis* are new to science.

Smith, C. A. Middleton. Mechanization in China. *Far Eastern Rev.* 33(9-10):339-348, 6 fig., 3 graphs, 1937.—The author is an engineer with many years of experience in the East. To insure safety of life and economy of construction in the mechanization of industry in China it is urged that engineering designs and materials used be tested under government supervision and that standards be raised to equal those demanded in Europe and America.

Sokolow, Iwan. Beiträge zur Kenntnis der Hydracarinen Sibiriens. *Arch. Hydrobiol.* 22(2):306-350, 6 pl., 1930.—The author presents a systematic list of 91 forms so far found in northern Asia (Siberia, Turkestan, and Mongolia), including synonymies, locality records, ecological notes, taxonomic remarks, and descriptions of new forms. Of the forms listed, 69 were previously known from Europe, 9 are cosmopolitan, and 22 are considered endemic in northern Asia. Most of them are eurythermal.

FROM BIOLOGICAL ABSTRACTS

Sonan, Jinhaku. II. Sauter's Formosa-collection: *Polistes*, *Montezumia* and *Pareumenes* (Hymenoptera: Vespidae and Eumenidae). *Arb. morph. tax. Ent. Berlin-Dahlem* 5(1):66-70, 3 fig., 1938.—There is a key to three color varieties of *Polistes japonicus* de Saussure including var. *formosana* Sonan *koshunensis* n. form, *Polistes mandarinus* (which also occurs in China), and *Montezumia* (*Pseudozumia*) *indica*, both de Saussure species, are listed, while *Pareumenes taiwanus* is described as a new species
W. E. H.

Sowerby, Arthur de C. The fretful porcupine. *China Jour.* 11 (5):249-252, 1 pl., 1929.—A popular account of 2 Chinese porcupines (*Itherurus macrourus* ssp. and *Hystrix subristatus* ssp.), with remarks on related forms. Their food consists of roots, tubers, and the green parts of plants. They do some damage to crops, but occur mostly in the wilder, less populated areas. They are nocturnal in habits. The flesh is eaten by the Chinese.

BIOLOGICAL ABSTRACTS

Sowerby, Arthur de C. Some favourite cage birds of the Chinese. *China Jour.* 13(1):35-41, 5 fig., 1930.—An illustrated account of various species

BIOLOGICAL ABSTRACTS

[**Sowerby, A. de C.**] The wild boar in China. *China Jour.* 12(1):49-50, 2 pl., 1930.—Notes on the distribution, characters, and habits of several species of *Sus*.

BIOLOGICAL ABSTRACTS

[**Sowerby, A. de C.**] The wild pig's summer coat. *China Jour.* 12(1):45-46, 1 pl., 1930.—Chinese wild pigs (*Sus* spp.) begin to shed their

coat in the spring and become naked in the summer except for the soft tips of new bristles. The summer coat is paler as well as much shorter than the winter coat, which is assumed by October or November.

BIOLOGICAL ABSTRACTS

Spoon, W. Voorwaarden door den gebruiker aan derrispoeder en derrisstuifmeugsel te stellen. [The properties required in derris powder and derris dust mixture.] *Tijdschr. Pijnkrt.* 43(8) :189-192, 1 fig., 1937.

Stantschinsky, W. W. Über die geographische Variation des Karmüngampsels *Erythrina erythrina* (Pall.). *Jour. Ornithol.* 77(2) :309-315, 1929.—Systematic review of 6 subspecies, 3 of which are new: *E. e. setshuanica*, W. China to Sikkim; *E. e. diamesa*, Mongolia and E. Siberia; and *E. e. pallidorosa*, Russian Turkestan.

BIOLOGICAL ABSTRACTS

Straneo, S. L. Note sulle *Feronia* paleearctiche (5a). Sulla posizione sistematica della *Feronia harpaloides* Woll. *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 59(14-16) :447-451, 2 fig., 1935-1937.—Three new species are described *F. (Pterostichus) cordatissima* from Japan, *F. (P.) cebrepunctata* from Yunnan, and *F. (Euryperis) magoides* from Altai. The relationships of these species and of *F. harpaloides* Woll. are discussed.

Straneo, S. L. Note sui *Platysma* paleartici. 3a. Su di alcune specie del subg. *Badistrinus* Motsch. e sottogeneri affini. *Ann. Mus. Civ. Stor. Nat. Giacomo Doria* 59(14-16) :145-157, 5 fig., 1935-1937.—Species discussed include *P. (Lianoe Goz.?) Mulleri* n. sp. from Korea. Under the species of *Badistrinus* are listed *P. Kahlyi* Motsch. from Mongolia, *P. Solskyi* Chaud. and *P. haptoderoides* Tschit. from China.

Sung, Hok-p'ang. Legends and stories of the New Territories. III. Kam t'in. (concluded) *Hong Kong Nat.* 8(3-4) :201-207, 2 pl., 1938.

Tagawa, M. The genus *Stenoloma* of Japan (In Japanese and English.) *Acta Phytotax. Geobot.* 6(3) :224-228, 1937.—Of the 3 species discussed *S. chusanum* (L.) Ching is also from Formosa and Korea.

Tagawa, M. On Japanese species of *Humata* Cav. (In Japanese and English.) *Acta Phytotax. Geobot.* 6(3) :228-233, 1937.—Four species and one variety are discussed. *H. Griffithiana* (Hook.) C. Chr., *H. macrostegia* n. sp., and *H. trifoliata* Cav. are from Formosa. *H. G.* var. *Tyermannii* (Moore) Tagawa is from Kwangsi Province.

Tagawa, Motozi. Speciesgum Pteridophytae Asiae Orientalis 14. (In English with Japanese summary) *Acta Phytotax. Geobot.* 6(3) :154-168, 1937.—In this division of the series 15 species are treated. Seven of them are new and taxonomic and distribution information is given for all species. Five of the species are from China, 2 from Tonkin and 14 from Formosa.

Takahashi, Ryoichi. Observations on the Coccoidea of Formosa. I. *Dept. Agri. Govt. Res. Inst. Formosa, Rept.* 40 :1-82, 11 fig., 1929.—The author enumerates 113 species and 2 varieties, of which 7 species and 1 genus are new and 20 species are recorded for the first time from Formosa. About 225 species of plants in some 160 genera and 61 families have been attacked by Formosan Coccoidea in the island alone. An alphabetical list of these hosts is given.

FROM BIOLOGICAL ABSTRACTS

Takeuchi, Kichizo. A study on the Japanese species of the genus *Macrophyia* Dahlbom. Hymenoptera: Tenthredinidae) *Tenthredo* 1 (4) :376-545, 9 pl., 3 text fig., 1937.—Prefaced by a brief glossary, some structural drawings, and an historical review there is given, in tabular form, an indication of the geographical distribution of the 34 species and 4 varieties (6 species and 1 variety new) discussed in the paper. There is a key to the

genus *Macrophya* in the Japanese Empire. *M. infumata* Rohwer also occurs in China. This monograph will be very useful to those interested in this family in east Asia.

W. E. H.

Tamanuki, Koichi. Systematic studies on the Cupedidae from Japan. *Debut. Zasshi* 40(476):242-254, 6 fig., 1928.—I-III. The author agrees with de Peirimhoff (1902) in placing the Cupedidae in Adephaga and points out its closer affinity with Rysodidae than with the Lymexylidae, on the basis of structural characters, including the aedeagus, which is figured by the author. IV. Systematic Descriptions and redescriptions of and key to 4 species and 1 variety of *Cupes*. Included is *C. formosanus* n. sp. from Formosa. V. Notes on distribution. FROM BIOLOGICAL ABSTRACTS

[**Tanaka, Tyôzaburô.**] [Wild ethi of the Japanese territories.] (In Japanese with English summary.) *Bulleten Sci. Fakult. Terkult. Kjusu Imp. Univ. Fukuoka, Japan* 2(1):51-58, 1926.

Tardieu-Blot, Mme, and Christensen, Carl. Les fougères d'Indochine (VII): Davalliacae-Dennstaedtiaceae. *Not. Syst.* 6(1):1-11, 1 pl., 1937. —Distribution notes are given for 25 species. *Davallia divaricata* var. *orientalis* C., *Microlepia Hookeriana* (Wall.) Pr., and *M. marginata* (Houtt.) C. are also reported from Hainan.

Tardieu-Blot, Mme, and Christensen, Carl. Les fougères d'Indochine VIII, IX, X: Nephrolepidace, Oleandrace, Plagiogyriace. *Not. Syst.* 6(3):129-134, 1937.—In this section 11 species are treated. *Nephrolepis acuta* (Sw.) Pr. Tent, *N. cordifolia* (L.) Pr., and *N. hisutula* (Forst.) Pr. are also from Hainan Island.

Tardieu-Blot, Mme, and Christensen, Carl. Les fougères d'Indochine XII. Gymnogrammeac. *Not. Syst.* 6(4):161-176, 1 pl., 1938.—Thirty-one species (including *Antholæna velutina* and *Adiantum Erythraeum*, n. spp.) are listed with distribution records. *Adiantum diaphanum* Bl and *A. flabellulatum* L. are also from Hainan Island.

Tchang, Tchung-Lin, 張春霖. The fishes of Hainan. *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(3):99-110, 1937.—Thirty-two species, 18 Cyprinidae, 3 Gobidae, 2 Siluridae, 2 Ophiocephalidae, the remaining 7 in 7 distinct families, are enumerated.

Tchang, Tchung-lin. A list of the fishes from Yangtse River. *Science.* (In Chinese) 14(3):398-407, 1929.—The list contains the scientific and Chinese names of 87 species. All these specimens are in the Biol. Lab., Sci. Society of China, Nanking. T. H. SHAW in BIOLOGICAL ABSTRACTS

Tchang, Tchung-Lin, 張春霖. Notes on a new *Barbus* from Yunnan. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(2):63-65, 1 fig., 1937.—*B. chonglingchungi* n. sp. is described. It is closely related to *B. normani*, but differs in having maxillary barbels, strong dorsal spines, larger scales and the absence of strong tubercle at the symphysis of lower jaw.

Tchang, T. L., 張春霖. The study of the genus *Silurus*. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(4):141-144, 1937.—A key and bibliographic references are given for the 6 species and varieties discussed. *S. glanis* L. is from Europe and Asia Minor, *S. wynaadensis* Day from India and China, *S. cochinchinensis* Cuv. & Val. from SW. Asia, *S. asotus* from China and Japan, *S. asotus* var. *aristotelis* (Agassiz) from Greece and China, *S. asotus* var. *longus* Wu from China.

Tchang, T. L., 張春霖. Study on some Chinese catfishes. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(1):33-56, 5 fig., 1936.—Thirty-five species of 9 genera were studied. The rare and

interesting species, *Silurus wynaudensis* Day, *Leiocassis chinensis* (Steindachner), and *Pseudecheneis sulcatus* (McClland), are redescribed and refigured. Keys are given to genera and species. Distribution notes are included for each species. The bibliography contains 54 references.

Teilhard de Chardin, P. La paléontologie des mammifères en Chine et l'œuvre du Musée Hoangho Paito. *Revue Sci. Illus.* 68(12) : 360-362, 1930.—Since 1926 the Geological Survey of China, the American Museum of Natural History, and the Hoang-ho Paito Museum of Tientsin have been collecting and studying the Eocene and Neogene fossil mammals of northern China. The results are briefly summarized.

B. F. HOWELL in BIOLOGICAL ABSTRACTS

Ting, Han-po. Two cases of abnormal hermaphroditism in *Rana nigromaculata*. *Peking Nat. Hist. Bull.* 12(3) : 213-220, 1 pl., 2 text fig., 1938.—Two adult hermaphrodites were found. They are described and sex characters are listed for each.

Todd, O. J. Engineering experience in China during the last two decades. *Far Eastern Rev.* 34(3) : 111-113, 1938.—The author describes experiences in road building, irrigation projects and river-control structures in China.

Todd, O. J. Future work for the engineer in China. *Far Eastern Rev.* 33(9-10) : 334-335, 1937.—An indication is given of the needs of China for engineering skill in development of roads, railways, river control, power, irrigation, timber production, mines, air service, radio, housing and recreation centers.

Todd, O. J. The progress of irrigation in north China. *Far Eastern Rev.* 34(2) : 75-77, map, 1938.—During the past few years there has been a movement to develop large projects to conserve available flow in the principal streams of China's dry northwest. Four projects are approximately completed: the Saratsi in Suiyuan Province, and the Wei Pei, Lo Ho, and Wei Ho in Shensi Province. The second was put into operation in 1937. The construction of each project is discussed.

Todd, O. J. Viewing the Yellow River in 1937. *Far Eastern Rev.* 33(7) : 289-290, 4 fig., 1937.—An outline is given of the engineering problems in the regulation of the Yellow River.

Toyama, Reizo. Spicilegium Muscolegiae Asiae Orientalis, 4. (In German with Japanese summary.) *Acta Phytotax. Geobot.* 6(3) : 169-178, 5 fig., 1937.—Among the 9 Japanese species discussed, *Palisadula chrysophylla* (Card.) Toyama and *Plagiothecium Nittakayamae* n. sp. are from Formosa.

Tsai, P. H., 蔡邦華, and **Chun, N. M.**, 鍾任模. Preliminary notes on *Mycalesis gotama* Moore injurious to the rice plant in China. (In Chinese with title also in English.) *Ent. & Phytopath.* 5(28-30) : 526-527, 1937 (Rec'd Jan. 10, 1938).—The adult of this Satyrid is described in detail. The chrysalid is green at first but darkens as development progresses. The chrysalid is attached head downward to the rice leaf. The light yellowish caterpillar has the head cleft on top and produced into two horn-like projections. The caudal end of the caterpillar is also produced into a pair of horny projections which are whitish with reddish tips. The gregarious larvae feed on lowland rice, bamboo, and a third plant whose scientific name cannot be ascertained from the Chinese name as given. The larva, chrysalid, and adult are figured.

Y. W. DJOU and W. E. HOFFMANN

Tseng, C. K., 曾呈奎. On marine Algae new to China. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(5) : 189-196, 1 pl., 9 fig., 1936; II. *ibid.* 7(6) : 231-255, 5 fig., 1937.—The marine

algal flora of China is scanty and imperfectly known. Islands far enough away from the coast not to be affected by the main rivers offer a more luxuriant growth of seaweeds. In this series of papers the author is describing species new to China, found by himself on his various collecting trips along the coast. The paper here reported is devoted to the blue green, the green and the brown algae. 42 species are listed with brief descriptions and habit notes. Habit drawings are given for 14 species.

Uchida, Toichi. Dritter Beitrag zur Ichneumonidenfauna Japans. *Jour. Fac. Agric. Hokkaido Imp. Univ. Sapporo* 25(1):1-115, 3 pl., 1928.—The author finds 149 species and 33 varieties in the area, 54 species and 21 varieties being new to science. Many of these forms are reported from Korea and Formosa.

FROM BIOLOGICAL ABSTRACTS

Uchida, Toichi. Einige Ichneumonidenarten aus Kotosho. *Insecta Matsum.* 12(1):9-12, 2 fig., 1937.—Eight species and forms of which three are new listed from Kotosho or Botel-Tobago, near Formosa. Several of the species are also found in Formosa while *Henicospilus lineatus* (Cameron) is recorded from south China, Formosa, and Korea. W. E. H.

Uchida, T., and Okada, I. Life-history of *Grapholitha glycinvorella* Mats. in Manchuria. (Preliminary report) *Kontyu* 11(5):331-343, 5 fig., 1937.—*Cydia* (*Grapholitha*) *glycinvorella* Mats., which is very injurious to soy beans in Manchuria, has one generation a year. The adults occur in August and early September, living for 10-13 days. The females lay their eggs singly, on the pods and sometimes on the leaves and twigs. The larvae hatch in 7-8 days and are full fed in 18-21 days. They then enter the soil and hibernate in cocoons. Pupation begins late in the following July, and the moths emerge 11-13 days afterwards.

REV. APPL. ENT.

Uchida, T., and Okada, I. On the relation between the oviposition of *Grapholitha glycinvorella* Mats. and the number of hairs on soy bean pods. (In Japanese.) *Oyo Dobuts. Zasshi* 9(2):100-104, 1937.—*Cydia* (*G.*) *glycinvorella*, Mats. is a serious pest of soy beans in Hokkaido and Manchuria. Observations in the latter country showed that the rate of infestation differs with the variety, because the moths prefer to oviposit on the more hairy pods and lay no eggs on pods that are hairless.

FROM REV. APPL. ENT.

Uyeki, H., and Sakata, T. Notulae ad plantas novae Koreae. (In English with Japanese summary) *Acta Phytotax. Geobot.* 7(1):14-19, 2 fig., 1938.—The new species *Aconitum puchronocicum* and *A. kaimense* are described. Five new varieties, 6 new forms, and 2 new names are included.

Van der Vecht, J. Descriptions and records of Oriental and Papuan solitary Vespidae (Hym.). *Treubia* 16(2):261-293, 5 fig., 1937.—The writer has examined a number of types in the course of preparation of this paper and his remarks should, accordingly, carry considerable weight. Several of the species treated are ones that occur in China. Of particular interest to us is the fact that the species whose biology was worked out by Father Piel and the name of which was given by him as *Pareumenes quadrispinosus* (see abstract in *Ling. Sci. Jour.* 14(4):744) is said to be *Pareumenes (pseumenes) depressus* Sauss., a species found in China, Sikkim, Sumatra, Siam, Tenasserim, and the Malay Peninsula. W. E. H.

Verhoeff, Karl W. Über Isopoden aus Turkestan. *Zool. Anz.* 91 (5-8):101-125, 22 fig., 1930.—This paper deals with 9 spp. from Turkestan, and 1 other from Korea. Only Porcellionidae are represented among 280 specimens from Turkestan. All possess 5 pairs of tracheal systems, indicating that conditions are more favorable for air-breathing than for gill-breathing spp. Taxonomy of the family is discussed.

FROM BIOLOGICAL ABSTRACTS

Villeneuve, J. Descriptions de Myodaires supérieurs nouveaux. *Bull. & Ann. Soc. Ent. Belgique* 66(8-10) :269-275, 1926.—*Tainanina* (n. gen.) *grisella* n. sp., *Zambesa claripalpis* n. sp., *Xenolophosia* (n. gen.) *hamulata* n. sp., and *X. diversipes* n. sp. are from Formosa.

FROM BIOLOGICAL ABSTRACTS

Villeneuve, J. Myodaires supérieurs nouveaux (Dipt.). *Bull. & Ann. Soc. Ent. Belgique* 68(1-2) :47-52, 1928; 69(3) :61-68, 1929.—Included are *Hoplocephala linearis*, *Rhynchomyia setipygia*, *Alsomyia anomala*, and *Eristalis polyvalens* from Formosa.

FROM BIOLOGICAL ABSTRACTS

Waddell, J. A. L. China's needs for proper development. *Far Eastern Rev.* 34(3) :93-97, 1938.—Successful development of China is considered to be essentially an engineering problem, based on a lasting peace, freedom from uprisings, financial reforms and a large-scale plan of development in order to tempt foreign loans. Brief notes are given on China's needs in such things as transportation, industries, sanitation and water supply, afforestation, mining.

Wagner, J. Über neue palaearktische Floh-Arten (Aphamptera). II. *Ann. Mus. Zool. Acad. Sci. URSS.* 30(4) :531-547. 10 fig., 1929/1930.—Fourteen new species and several new subspecies are described. *Rhadinopsylla accola* and *R. vicina*, on *Putorius* sp., are recorded from Tibet; *Paradoxopsyllus conveniens* and *Ceratophyllus laeviceps* ssp. *mongolicus*, on *Ellobius tancrei*, and *Cystipsylla* (n. gen.) *kiritschenkoi*, from burrow of unknown rodent, are described from Mongolia.

FROM BIOLOGICAL ABSTRACTS

Wai, Nganshou. A new species of Mono Mucor, *Mucor sufu*, on Chinese soybean cheese. *Science* 70(1813) :307-308, 1929.—*M. sufu* n. sp. is shown to be active in the production of "sufu," a well-known Chinese fermented food prepared from soybeans.

BIOLOGICAL ABSTRACTS

Wang, Chenting T. Future of China's roads and railroads. *Pan-Pacific* 1(3) :10-13, 1937.—The pressing problem of the development of good roads and railroads, which are essential to national development, has been vigorously attacked in China in recent years. About 70,000 miles of roads and 10,000 miles of railroads have been built to the present time and many new projects for construction are under way.

Wang, F. T., and Tang, T. 汪發纘, 唐道. Notes on Chinese Liliaceae. IV. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 7(6) :281-304, 1937.—In this part of the series 19 new species are described. There are also 11 new varieties, one new name and 11 new combinations.

Ward, F. Kingdon. *Rhododendron repens* and its allies. *Gard. Chron.* [London] 86(2232) :266-267, 1929.—Subseries *forrestii* of series *neriiflorum* contains *R. forrestii*, *R. repens*, *R. erustum*, and *R. porphyrophyllum*. The writer would rule out the last two, and perhaps reduce the first to *R. repens*, which proves to be wide-spread in Yunnan, Burma, Tibet, and the Himalayas. The technical characters of related species are discussed: Carmelita, Scarlet Pimpernel, Rose of Kaso. The latter plants, growing well in Scotland, have not yet flowered there, while *R. repens* flowers freely at Edinburgh. A colored plate of "Rhododendron King George" forms a supplement to this number of the journal.

N. C. FASSETT in BIOLOGICAL ABSTRACTS

Ward, F. Kingdon. Three new rhododendrons from Tibet. *Gard. Chron.* [London] 86(2244) :503-501, 1929.—The new species, *R. rivulare*, *R. fragariflorum* and *R. tsangpoense*, are described. FROM BIOLOGICAL ABSTRACTS

Ward, K. M., and Johnston, C. J. R. Citrus Red Scale—Progress Report on Investigations, 1935-6. *Jour. Dept. Agri.* 35(8):397-416, 16 fig., 10 tab., 9 graphs., 1937.—This is a very detailed study of *Aonidiella aurantii* Mask. a species which is injurious to citrus in south China. Life history and control are discussed in detail and illustrated. In Victoria when the mean daily temperature was 72° F. the life cycle from birth to reproduction was 69 days; the female may continue to reproduce for 60 days, producing as many as 145 larvae. Oil emulsions gave better control than did miscible oils. A satisfactory strength of oil emulsion was 2.5 per cent in water, i.e. 1 in 40. Information is also given on fumigation. Twenty-four references are given.

W. E. H.

Wardlaw, C. W. Tropical fruits and vegetables. An account of their storage and transport. *Trop. Agriculture* 14(12):342-350, 1937.—[See also *Ling. Sci. Jour.* 17:133.] In this section of the report the following are treated: tomato, topepo, tree tomato (*Cyphomandra betacea*), watercress (*Nasturtium officinale*), yams (*Dioscorea alata* and *D. spp*), cassava (*Manihot utilissima*), langsat (*Lansium domesticum*). References are included under each heading.

Warren, B. C. S. Stray notes on Erebidae species. *Ent. Record* 42(2):26-29; (4):56-58, 1930.—Taxonomic notes are given on various species, including *Erebia dabaniensis* ab. *confusa* and *E. kozhantschikovi* ab. *rubescens*, n. abs., from Sajan Mts., Mongolia.

FROM BIOLOGICAL ABSTRACTS

Watanabe, Chihisa. On some species of Braconidae from Manchoukuo (Contributions to the knowledge of the Braconid fauna of Manchoukuo, I). *Insecta Matsum.* 12(1):39-44, 1 fig., 1937.—Nine species, including *Apanteles kariyai* n.sp., are listed for Manchuria.

W. E. H.

Watanabe, Chihisa. On three Braconid parasites of the soybean pod borer, *Grapholita glyciniorella* Matsumura (Contributions to the knowledge of the Braconid fauna of Manchoukuo, II). *Ins. Matsumurana* 12(2-3):131-135, 1 fig., 1938.—*Chelonus pectinophorae* Cushman, *Phanerotoma planifrons* (nees), and *Micromus glyciniorellae* n. sp. are parasites of the larvae of the soybean pod borer, *Grapholitha glyciniorella* Mats. in Manchuria. The first two species named above are widely distributed. The new species, the wings of which are figured, resembles *Micromus diversus* (Muesebeck), a parasite of *G. molesta* Busck in Japan but differs from it in the structure of the abdomen and in the color of the body.

W. E. H.

Wilder, George D. (Compiled by N. Gist Gee, Lacy I. Moffett, and G. D. Wilder.) Additions to the tentative list of Chinese birds. *Peking Soc. Nat. Hist. Bull.* 4(1):43-46, 1929.—About 45 additional forms are listed, generally with locality records.

BIOLOGICAL ABSTRACTS

Wilder, Geo. D. Migration notes. The changing of habitats and rare occurrences of birds. *China Jour.* 10(4):193-198, 1 pl., 1929.—Data are given on the winter distribution of certain birds in Tunghsien, Chihli, Feb. 25 and March 1. Birds once considered common in certain districts, which now have become rare and other forms, once rare or totally absent, were observed. On Oct. 20, *Oidemia fuscata stejnegeri* was collected on an inland canal. Dec. 10, what was probably *Phoenicurus alaschanicus* was seen in Tunghsien. Other rare visitors observed were *Certhia familiaris*, *Coccothraustes c. japonicus*. A whiteheaded goose, seen but not collected, near Liu Chiang, is referred to by the author as most probably *Anser leucopsis*, which would be straying far east of its recorded habitat. On June 25, the rare *Dryocopus martius* was seen at Tunghsien. Bustards, as winter visitors, are noted as increasing steadily. Geese were plentiful about Pekin on account of the mild winter. Great flocks of Pied Jackdaws, which "blackened the ground for acres," were seen at Nanking. R. DE SCHAUENSEE in BIOLOGICAL ABSTRACTS

Wileman, A. E. Description of a new genus and new species of Noctuidae. Subfamily Ophiderinae. *Ent. Rec. & Jour. Variation* 49: 174-176, 1928; 41(2): 23-25; (3): 47-50, 1929.—*Epispa* *taiwana* and *Pangrapta plumbilineata* are described from Formosa. FROM BIOLOGICAL ABSTRACTS

Wileman, A. E. Horae Formosanae. The Syntomidae of Formosa. *Trans Ent. Soc. London* 76(2): 417-452, 1 pl., 1929.—There is a diagnostic list containing 2 new subspecies and notes on morphology, synonymy and range. FROM BIOLOGICAL ABSTRACTS

Williams, Louis O. Orchid studies, IV. The orchids of the Fiji Islands. *Bot. Mus. Leaflets. Harv. Univ.* 5(7): 105-142, 5 fig., 1938.—There is an annotated list of all species so far known from Fiji. Several new species are described. Range beyond Fiji is also noted. *Liparis longipes* Lind. is recorded from China.

Williams, Louis O. Orchid studies V. *Bot. Mus. Leaflets, Harvard Univ.* 5(9): 164-170, 1938.—*Orchis constricta* n. sp and *Oberonia latipetala* n. sp. are described from Yunnan. Neither is closely allied to any other species. Notes are also given on species of *Taeniophyllum* Blume from the Philippines.

Wingelmüller, Alois. Monographie der paläarktischen Arten der Tribus Cionini. *Koelopt. Runds.* 23(4-5): 143-192 21 fig., 1937; (6): 193-221, 14 fig., 1938.—Only one species, *Cleopus japonicus* Wingelmüller, is recorded from China.

Wnukowsky, W. Neue Lepidopterenformen aus Nordost Sibirien und dem mongolischen Altai. *Mitteil. Munchen Ent. Ges.* 17(7-12): 69-72, 1927.—Mongolian forms are *Synchloe callidice orientalis* ab. *meinhardi*, *Argynnis pales generatrix* ab. *extrema*, and *Melanargia suvarovi* ab. *subflavescens*, all new aberrations. FROM BIOLOGICAL ABSTRACTS

[Wolf, E. L.] [Manchurian walnuts] (In Russian with German summary.) *Bull. Jard. Bot. Prince URSS.* 27(3): 349-352, 1928.—Taxonomic notes on *Juglans mandshurica*, *J. stenocarpa* and *J. cathayensis*. BILOGICAL ABSTRACTS

Wolfe, L. R. Accipitres of Peking, China. *Oologists' Rec.* 10(1): 2-3, 1930.—Bird notes from a journey through northeastern China. BILOGICAL ABSTRACTS

Wood, Albert Elmer. Two new rodents from the Miocene of Mongolia. *Amer. Mus. Novitates*, No. 865, 7 p., 1 fig., 1936.—*Protolactagia tunggurensis* and *Prosiphneus lupinus* are described and figured as new species from the Upper Miocene Tung Gur Beds of Mongolia. W. E. H.

Worsley, R. R. Le G. Rotenone. Part I. The determination of rotenone. Part II. Evaluation of plants containing rotenone. *Amani Memoirs* Part I, 8 p., 6 tab., 1936; Part II, 8 p. 9 fig., 8 tab., 1937. (Reprinted from the *Jour. Soc. Chem. Ind.* 15(51): 349-357, 1936, and 16: 15-23, 1937).—Ethyl acetate is a new and very efficient solvent for rotenone in samples of *Mundulea* and *Derris* samples. Rotenone is separated as its carbon tetrachloride complex. The purity of the complex is determined by stirring with alcohol and methods and precautions are discussed. Four different types of *Derris elliptica*, *D. malaccensis*, *D. polyantha*, and *Mundulea suberosa* were examined biologically and chemically and no correlation found between toxicity and ether extract or rotenone contents. When, however, "The 'dehydro-compounds', determined by an optical rotation method, were calculated as percentages of the ether extractive matter, instead of as percentages of the whole sample, there a direct correlation was found." W. E. H.

Wu, Chen-chung. A preliminary report of studies on control measures for Chinese cotton aphids. *Peking Nat. Hist. Bull.* 12(2) :95-112, 6 tab., 1 map, 1937.—There are notes on the biology, morphology and distribution of *Aphis gossypii* Glover in China. Control by clean-farming and by various insecticides is discussed. A plan for extending control measures is presented. This is a condensed account of an article published originally in Chinese and reviewed in the Lingnan Science Journal 17(1) :135.

Wu, Chenfu F. (胡經甫). The Stoneflies of China (Order Plecoptera). *Peking Nat. Hist. Bull.* 11(2) :163-189, 1936; 11(3) :297-307, 11 (4) . 441-443, 12 (1) : 57-70, 12 (2) : 127-166, 140 text fig., 1937.—The paper is an attempt to summarize the knowledge on Chinese stoneflies. There are descriptions of 109 species in 29 genera. There are lists of genera and species, keys, and detailed descriptions. There is a bibliography of the 28 papers that have been previously published on Chinese stoneflies. No new forms are described. (To be continued.)

Wu, Lien-Teh, et al. Notes on the history of Chinese medicine. *Chinese Med. Jour.* 53(4) :313-390, 21 fig., 10 tab , 1938.—Seven short articles on the history of Chinese medicine are included Topics discussed are Past and present trends in the medical history of China, by Lien-Teh Wu; Some of Dr. Hobson's medical works in the Chinese language, by C. S. Yang; Men of note in the history of leprosy of the East, by L. S. Huizenga; Dietary principles in ancient Chinese medicine, by H. C. Hou; Chinese Materia Medica. A review of some of the work of the last decade, by B. E. Read; Posology of Chinese drugs, by F. P. Yueh; History of Chinese spectacles, by C. P. Rakusen. A comprehensive review of the history of Chinese medicine from the Chou dynasty up to the time of the introduction of modern medicine, is given. The regional distribution of well-trained physicians is recommended and the introduction of State Medicine is strongly urged. A brief autobiography is given of Dr. Benjamin Hobson, together with a review of his three books published in Chinese, "Outline of Anatomy and Physiology," "An Outline of Western Medicine," "Modern Views of Internal Medicine." The importance of diet to health and some dietary principles advocated by Chinese are pointed out. But in spite of these, the health status of the masses is still poor, and the nutritional deficiency diseases are common Emphasis should be laid on the nutritive value of foods. A list of Chinese herbs hitherto known is given together with their Romanized names, Chinese names, scientific names and dosages. Much of the therapeutic values in the herbs remains to be investigated. A summary of the last ten years' works in the Chinese Materia Medica is made. The review includes Ancient documents, Pharmacognosy and botany, Chemistry of Chinese drugs, Physiological action of Chinese drugs, and foreign contributions. H. C. Ma

Yabe, Hisakatsu, and Oishi, Saburō. *Desmopteris* (?) *orientalis* n. sp. from the Kobōsan District of Corea. *Jap. Jour. Geol. & Geogr. Trans.* 8(1-2) :11-12, 1 pl., 1930.

Yabe, Hisakatsu, and Osaki, Kin-emon. Girvanella in the Lower Cambrian of South Manchuria. *Sci. Rept. Tōhoku Imp. Univ. Geol.* 14(1) :79-83, map, 1 pl., 1930.—*G. manchurica* n. sp.

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Yamada, Hakusai. Agriculture in Taiwan. (In Japanese.) *Jour. Geogr. [Tokyo]* 42(499) :526-531, 1930.

Yamamoto, Y. Note ad species *Formosana* generis *Iteae* (*Saxifragacearum*). (In Latin with Japanese summary.) *Acta Phytotax. Geobot.* 6(4) :245-250, 1 pl., 1937.—Two new varieties, *I. arisanensis* var. *longifolia* and *I. a.* var. *parviflora* are described from Formosa. *I. chinensis* Hooker & Arnott (Formosa, Liu-Riu Is., SE. China), *I. parviflora* Hemsley and *I. arisanensis* Hayata (both Formosa) are redescribed.

Yamamoto, Y. Notae ad plantas Japoniae et Formosae (II, III, VI). *Bot. Mag. [Tokyo]* 40(469):31; (476):453-454, 1926. 41(492):736-737, 1927.—Contains notes in Japanese on *Aster subulatus*, *Brachyactis ciliata*, *Podocarpus macrophylla*, and *Mitrastemon kawa-sasaku* Hayata from Formosa.

BIOLOGICAL ABSTRACTS

Yamashina, Y. [On birds newly collected in Korea.] [In Japanese.] *Tori* 6(28):168-169, 1929.—Eight birds are reported as new to this region.

BIOLOGICAL ABSTRACTS

Yan, Foo-shan, 楊福山. Experiments on the controlling of Wheat Loose Smut at Ningpo in 1936. (In Chinese with title also in English.) *Ent. & Phytopath.* 5(28-30): 528-542, 14 tab., 1 fig., 1937 (Rec'd Jan. 10, 1928).—The best method of controlling Loose Smut of wheat is treatment of the seed. Experiments were conducted which consisted of soaking the seeds in cold and in warm water in three different ways and in chemicals. The method is given in detail. The methods of soaking the seed in chemicals were as follows. (1) soaking the seeds in 0.1% copper sulfate solution for 1 1/2 hours and drying before sowing; (2) soaking the seeds in cold water for 5 hours, after which soak in 0.1% copper sulfate solution for 10 minutes after which dry; (3) soaking in cold water for 4 hours after which place in 0.1% solution of formalin for five minutes and dry; (4) as in (3) except keeping in formalin solution ten instead of five minutes. The author concludes that the best method consists of soaking the seeds in cold water for 5 1/2 hours, then in water of 55.5°C. for 5 minutes, then in cold water, after which dry before sowing.

Y. W. DJOU and W. E. HOFFMANN

Yang, We-i, 楊惟義. A new genus and species of Urostylidae from Tonkin in the collection of British Museum (N. H.). (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(4): 159-165, 3 fig., 1937.—*Urocheletus* n. gen. is distinguished by having the humeral or lateral angles of pronotum strongly prolonged and the mesosternum deeply sulcated. The genotype is *U. acutihumeralis* n. sp. from Chapa, Tonkin.

Yang, We-i, 楊惟義. The outbreak of the *Urochela distincta* Distant in Lushan (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(2): 57-62, 3 pl., 2 fig., 1937.—An outbreak of this Heteropteran pest occurred near Kuling, in 1936. The insects fly in great hordes that may completely cover a village. They hide in cracks, clefts in rocks and under houses. At present, the insect is known only from China, in Chekiang, Kweichow and Shensi Provinces. Control measures recommended are: (1) filling the clefts of rocks with clay; (2) planting pine trees to replace the shrubs which the insects feed upon. Immediate control has been effected by spraying with cyanide or kerosene or by firing the masses. The most effective method found was the explosion of 5-10 grams of gunpowder placed in the hole of a bamboo gun and thrust into crevice where the insects are hidden.

Yü, S. C., 喻兆琦. On a new species of the genus *Solenocera* Lucas. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(3):111-118, 5 fig., 1937.—Only one species of this genus has been found in China. It is related to the Indian species *Solenocera Melantho* de Men and is here described as a new species, *S. sinensis*, from Amoy.

Yü, S. C., 喻兆琦. Notes on new fresh-water prawns of the genus *Palaemon* from Yunnan (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 6(6):305-314, 4 fig., 2 tab., 1936.—Forty-two specimens of prawns from Yunnan were examined and found to belong to two species. To *Palaemon brevicarpus* is referred the new variety *heterochirus*. The new species *P. yunnanensis* is unrelated to any known species of *Palaemon* living in China.

Yü, S. C., 喻光琦 Synopsis of the genus *Lamproglena* Nordmann with description of a new species from north China. (In English with Chinese summary) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(4):131-139, 7 fig., 1937.—There is a key to the 6 species of the genus with notes on locality and habitat of each. The species are parasites on freshwater and saltwater fishes. *Lamproglena Chinensis* n. sp., from the gills of *Ophiocephalus argus* Cantor, was found in Hopei Province. This is the first record of the genus from China.

Zdansky, Otto. Die Saugetiere der Quartärfauna von Chou-K'ou-Tien. *Geol. Surv. Palaeontologia Sinica* 5(4). 1-146, 16 pl., 16 fig., 1927.—Species reported are. *Scaptochirus primitivus* n. sp., *Neomys sinense* n. sp., *Ursus angustidens* n. sp., *Felis acutidens* n. sp., *Uricetus varians* n. sp., *Sus lydekkeri* n. sp., *Homo* sp., and the first known remains of *Sinanthropus pekinensis* (Black & Zdansky). O. ZDANSKY in BIOLOGICAL ABSTRACTS

Zdansky, Otto. Weitere Bemerkungen über fossile Cerviden aus China. *Palaeontologia Sinica Ser. C.* 5(1). 1-21, 1 pl., 6 fig., 1927.—Several deer already known from China are mentioned from new localities. The Pleistocene *Cervus humilis* from Chihli is new. *C. canadensis mongolica* is a n. n. for *C. mongolica* Gaudry. *C. canadensis fossilis* Zdansky is a synonym. O. ZDANSKY in BIOLOGICAL ABSTRACTS

Zimmermann, A. (continued by **Gschwendtner, L.**) Monographie der palaearktischen Dytisciden. *Koleopt. Rundschau*, Wien, VII. Colymbinae 22(1-2) 61-80, (3-4), 1936; VIII. Dytiscinae 23(1-2) .57-72, (3) .73-92, 1937.—In Part VII the genera *Rhantus*, *Nartus*, *Melanodytes*, *Colymbetes* and *Meladema* are discussed. In Part VIII the tribes *Eretini*, *Hydatini*, and *Thermonectini* are treated. Many Asiatic species are listed, including 6 species of *Hydaticus*, *Rhantatus congestus* Klug., *Sandracottus fasciatus* F. and *S. festivus* Ill., *Graphoderes Adamsi* Cl., and *Acilus sinensis* Peschet from China.

Zumpt, F. Curculioniden-Studien XXIII. Vier neue palaearktische Russler Arten (Col.). *Mitt. Deut. Ent. Gesell.* 8(1) 10-15, 4 fig., 1937.—Four new species are described. *Episomus freyi* is from Yunnan.

Zumpt, F. Uebersicht über die derzeit bekannten *Carcilia*-Arten mit Beschreibung einer neuen Art. (Curculionidenstudien XXII). *Koleopt. Rundsch.*, Wien, 23(1-2) .23-24, 1937.—*C. marshalli* n. sp. is described from Yunnan, *C. strigicollis* Roel is from Japan, *C. mesosternalis* Heller from Formosa.

Zumpt, F. Zwei neue Russelkäfer aus China. Curculioniden-Studien XV. *Mitt. Deut. Ent. Gesell.* 7(1) 14-16, 1936.—*Xylinophorus (Meteutinops) guntheri* and *Cleonus freyi*, both new species, are described

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SOME HISPINE BEETLES FROM HAINAN ISLAND (COLEOPTERA: CHRYSOMELIDAE: HISPINAE)¹

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This constitutes the second report² on beetles collected by the writer on an independent trip³ to Hainan Island, south of China, made during the summer of 1935. Twenty-three species of the sub-family Hispinae (leaf-mining plant-beetles) were collected. All of these species were heretofore unrecorded from Hainan, and ten of them are here described as new species. Keys are given to the species of the genera *Callispa* and *Dactylispa*. The types of the new species are deposited in the United States National Museum, or are placed on loan deposit in the California Academy of Sciences in San Francisco. The paratypes and other specimens are in the writer's collection, the Lingnan Natural History Survey and Museum, and the California Academy of Sciences (Van Dyke Collection).

Tribe Callispini

Genus *Callispa* Baly, 1858

1. *Callispa bowringii* Baly

Callispa Bowringii Baly, Cat. Hispidæ Brit. Mus. 1:5, 1858 (Hong Kong).

A single specimen of this broad, shining, steel-blue species was collected at Ta Han, alt. 750 meters, central Hainan, June 24, 1935, J. L. Gressitt.

2. *Callispa dimidiatipennis recticollis* n. subsp.

Narrowly oblong, constricted anteriorly; body shining; head, pronotum, scutellum and anterior two-fifths of elytra reddish-ochraceous; apical portion of elytra steely blue; ventral surface of body and legs orange-testaceous; antennae black, except for first segment which is rufo-piceous. Body glabrous except for short

¹ Contribution from the Lingnan Natural History Survey and Museum.

² See Gressitt: Some Tortoise Beetles from Hainan Island (Coleoptera: Chrysomelidae: Cassidinae), *Lingnan Science Journal*, 17(2):185-193, 1938.

³ See Gressitt: Notes on Collecting in Hainan Island with Data on Localities, *Lingnan Science Journal*, 15(3):465-470, 1936.

adpressed silvery hairs on antennae, erect buffy hairs on margin of last abdominal segment and orange pile on tibiae and tarsi.

Head strongly transverse, smooth and impunctate above; occiput broader than long; vertex briefly and subtruncately produced between antennae; eyes deeper than wide, strongly convex anteriorly, feebly concave posteriorly, widest at about middle. Antennae nearly one-half as long as body, moderately slender; scape small, two-thirds as long as second segment; third slightly longer than second; fourth and fifth each about as long as, and more cylindrical than, second; sixth to tenth shorter; last longest. Prothorax subrectangular, fully twice as broad as long; sides nearly parallel, very slightly narrowed anteriorly, with antero-lateral angles rounded; base very slightly constricted at each side; basal margin sinuate; apical margin broadly and shallowly emarginate; surface transversely depressed near base, swollen in middle, deeply punctured on each side, finely and irregularly punctured on ventral portion. Scutellum slightly broader than long, obtusely rounded behind, smooth. Elytra narrowly margined, conjointly rounded apically, slightly compressed; surface subregularly striate-punctate, punctures in ten rows near base and in eleven behind middle, scutellar row of five punctures, punctures deepest on base and middle of side. Ventral surface with distinct punctures on sides of metathorax and fine, irregular punctures on abdomen; posterior femora not reaching apical margin of second abdominal segment. Length 5.3 mm.; breadth 2.1 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Han, alt. 750 meters, near Red Mist Mountain, central Hainan, June 23, 1935, J. L. Gressitt.

Differs from typical *C. dimidiatipennis* Baly [Cat. Hisp.: 7, 1858 (N. India)], of northern India, Assam and Burma, in being smaller, in having more than the posterior half of the elytra blue, the head broader, the prothorax more rectangular, the third antennal segment shorter than the first and second united, etc.

3. *Callispa fortuneii emarginata* n. subsp.

Body oblong, subrounded anteriorly and posteriorly; shining: head, pronotum and scutellum bright reddish-testaceous; antennae black; elytra steely blue, blackish along margin, suture and base, legs and ventral surface of body reddish-testaceous, paler than head and pronotum; claws rufo-piceous.

Head transverse not quite half as broad as prothorax; occiput squarish, slightly convex, smooth and impunctate; vertex feebly produced; eyes suboviform, wider above than below. Antennae barely two-fifths as long as body; longitudinally striated; apical segments thinly clothed with very short, oblique hairs; segments more or less cylindrical, except third, which tapers from apex to base; scape shorter than second segment; second shorter than third; fourth

to tenth subequal, each intermediate in length between second and third. Prothorax more than twice as broad as long, broadly emarginate anteriorly; sides feebly rounded, gradually narrowed anteriorly; base with a broad, truncate, produced portion in front of scutellum; surface finely and sparsely punctured on swollen portion of disk, strongly punctured at sides, more closely so near base. Scutellum slightly broader than long, obtusely angulate posteriorly, smooth. Elytra subparallel, broadly rounded apically; surface punctured in eleven rows behind middle, in ten rows basally, including scutellar row of four or five punctures; rows on inner half slightly arched interiorly; punctures deeper on base and middle of sides, finer apically. Sides of metasternum deeply and sparsely punctured; abdomen finely and sparsely punctured; posterior femora barely reaching to base of third abdominal segment. Length 5.7–6.4 mm.; breadth 3.2–3.5 mm.

Holotype (United States National Museum), Ta Han, alt. 750 meters, central Hainan, June 23, 1935, J. L. Gressitt; two paratotypes, one in Lingnan Natural History Survey and Museum, other in Gressitt collection, June 22 and 24.

Differs from *C. fortunei* Baly [Cat. Hisp.: 6, pl. 4, fig. 2, 1858 ("N. China")] in being slightly shorter and more rectangular, in having the antennae more slender, the prothorax slightly more narrowed anteriorly, with more rounded apical angles, and much more emarginate anteriorly, the scutellum more triangular and the elytra more deeply punctured. Distinguished from *C. brettinghami* Baly, of Burma, by having the vertex only slightly produced, the prothorax broader, more emarginate apically, the ventral surface slightly punctured, the antennae black instead of red, etc.

4. *Callispa karena* Maulik ?

Callispa karena Maulik, Fauna Brit. India, Col.: Hisp., Cossid.: 62, 1919 (Burma, Tongking and Laos).

Two examples were taken at Ta Han, alt. 750 meters, central Hainan, June 23, 1935, J. L. Gressitt.

Key to Hainan Species of *Callispa*

- A. Anterior portion of body red; elytra partly or entirely steel-blue or violet; prothorax strongly transverse, more or less rectangular; scutellum obtusely angulate behind B
- Dorsal surface of body entirely blue-green; prothorax strongly narrowed anteriorly; scutellum rounded posteriorly *boweringii* Baly
- B. Elytra entirely steel-blue or bluish-violet; prothorax rounded at sides . C
- Elytra red basally, steel-blue apically; prothorax nearly parallel-sided *dimidiatipennis recticollis* Gressitt
- C. Elytra irregularly punctured, greenish near scutellum, bluish-violet laterally; length over 8 mm. *karena* Maulik
- Elytra regularly punctured in about eleven rows, steel-blue; length less than 7 mm. *fortunei emarginata* Gressitt

Tribe **Oncocephalini**Genus **Oncocephalus** Chevrolat, 18475. **Oncocephalus atratangula** n. sp. (pl. 11, figs. 1 and 2)

Depressed, subtriangular, tuberculate; head with a seven noded swelling on dorsal surface. Color orange testaceous to reddish-ochraceous, marked with black: head light ochraceous in front, dark reddish around mouthparts and sides; dorsal protuberance resinous, eyes black; antennae dull reddish-brown, first and last segments paler; prothorax yellowish-ochraceous, tinged with reddish, indistinctly marked with black along mid-dorsal line behind base, and tinged with black on sides; scutellum ochraceous basally and black apically; elytra largely reddish-ochraceous, in margins subtestaceous, except for black postero-lateral angles, the disk darker brown on most of tubercles, traversed by an incomplete, oblique blackish stripe commencing on sides below humeri and culminating on large post-median crests and a transverse band before apices which extends into the black of postero-lateral angles; ventral surface ochraceous; first abdominal segment and legs yellowish. Body glabrous.

Head deep; dorsal protuberance of occiput with seven tubercles, the first two projecting forward well beyond vertex, nearly fused, second pair extending upward and outward and slightly forward, other three posterior, short and bluntly rounded; frons oblique, deeper than wide, convex and sparsely and shallowly punctured. Antennae thick, finely striated longitudinally, two-thirds as long as body; scape longer than second segment and shorter than third; fourth barely longer than scape; fourth to tenth slightly decreasing in length. Prothorax broader than long, each side with an anteriorly projecting tubercle at front margin, a small tubercle behind this; middle of side rounded and base produced; basal margin strongly convex at middle; disk uneven, a pair of strong tubercles before middle, mid-line depressed behind center, an oblique depression on either side near base, and remainder coarsely rugulose-punctate. Scutellum small and narrow. Elytra about twice as broad as prothorax at base, widened behind middle to postero-lateral angles, which are subacute, and convex posteriorly; margins finely serrated; surface of each with nine or ten rows of deep punctures, besides a short sutural row, the rows in pairs, separated by four ridges, innermost of which is moderately raised near base, weakly so before middle and strongly elevated just behind middle, outer rows each slightly raised at one or more points. Metasternum deeply punctured laterally; abdomen finely wrinkled. Length 4.8 mm.; breadth 3.1 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Chung Kon, alt. 300 meters, west central Hainan, July 19, 1935, J. L. Gressitt.

Differs from *O. siamensis* Gestro [Ann. Mus. Civ. Genova 1899: 321, fig. 9 (Siam)] in having the dorsal protuberance of the head

wider, with the lateral extensions much more slender, the anterior portion more truncate and tapering, the posterior end more blunt. The postero-lateral angles of the elytra are distinctly black, the lateral and posterior margins are not very pale, and the apical margin is slightly sinuate in *atratungula*. Differs from *D. quadrilobata* Guerin, of India, Ceylon, Andamans and Burma, in having the second pair of tubercles on cephalic protuberance more slender and pointing more upward and anteriorly, the prothorax more uneven at sides, etc.

Tribe Gonophorini

Genus **Agonia** Weise, 1905

6. **Agonia maculigera** (Gestro)

Gonophora maculigera Gestro, Ann. Mus. Civ. Genova 26 : 131, 1889
(Burma).

Agonia maculigera Maulik, Fauna Brit. India, Col. : Hisp., Cassid. : 128, 1919

Two specimens were taken: one at Nodoa, alt. 250 meters, west central Hainan, June 28, the other at Fan Ta, alt. 300 meters, southeast of Nodoa, July 17, 1935, J. L. Gressitt.

Tribe Hispini

Genus **Monochirus** Chapuis, 1875

7. **Monochirus** sp.

Several examples were taken at Ta Han, alt. 750 meters, June 21, Fan Ta, alt. 310 meters, July 19, and Chung Kon, alt. 290 meters, July 19, 1935, in the central part of Hainan Island, J. L. Gressitt.

Genus **HisPELLA** Chapuis, 1875

8. **HisPELLA** sp.

A single specimen was taken at Ta Hau, alt. 190 meters, western Hainan, July 7, 1935, J. L. Gressitt.

Genus **Rhadinosa** Weise, 1905

9. **Rhadinosa fleutiauxi** (Baly)

Hispa Fleutiauxi Baly, Ann. Soc. Ent. France Ser. 6, 9 : 491, 1889
(Phnom-Penh, Cochinchina).

Rhadinosa Fleutiauxi Weise, Coleopt. Cat. 35 : 62, 1911.

Four specimens were collected: one at Ta Han, alt. 750 meters, June 22, one at Chung Kon, alt. 290 meters, July 19, and two at Dwa Bi (Tai Pin), alt. 340 meters, July 24 and 30, 1935, central part of Hainan Island, J. L. Gressitt.

10. **Rhadinosa reticulata** (Baly)

Hispa reticulata Baly, Ann. Mus. Civ. Genova 26 : 665, 1888 (Teinzo, Burma).

Rhadinosa reticulata Maulik, Fauna Brit. India, Col. : Hisp. Cassid. : 164, fig. 52, 1919.

Genus **Dactylispa** Weise, 189711. **Dactylispa atracumina** n. sp. (pl. , fig. 3)

Body suboblong, short, slightly broadened posteriorly; prothorax with three dorsal, and four lateral, spines on each side. Ground color reddish-testaceous, considerable portion of elytra blackish; head dark reddish-testaceous, lighter on middle of frons; antennae dull reddish-testaceous, clothed apically with fine golden-buff pubescence; prothorax reddish-testaceous with spines paler and black-tipped, disk with an ill-defined pitchy black spot on either side of center; scutellum testaceous in center, dusky around margins; elytra reddish-brown on disk with base and median portion of each piceous, dorsal spines largely black or piceous, suture rufo-piceous and marginal spines reddish-testaceous with apical third blackish, those near postero-lateral angles largely piceous; meso- and meta-sterna rufo-piceous; abdomen and legs brownish-testaceous.

Head squarish in front; occiput smooth behind, depressed and with fine radial striations between eyes; vertex with a small projection between antennal insertions; frons twice as broad below as above, convex, closely punctured; eyes oval, narrowed below. Antennae nearly three-fourths as long as body; basal segments punctured; scape as long as second and third segments combined, thickest just beyond middle; third segment twice as long as second and one-half again as long as fourth; fourth and fifth subequal; sixth shorter than fifth or seventh; seventh to last cylindrical, subequal, thicker than third to sixth. Prothorax strongly transverse, cylindrical anteriorly; anterior border with a group of three spines on each side of middle, those of each group arising from a common base, the hindermost diverging first, nearly vertical, longest, anteriormost shortest, nearly horizontal, feebly curved upward; a group of four spines at each side, arising from a common expansion of lateral margin, hindermost barely one-half as long as preceding spines and arising separately from others, first three with a common base, each nearly of same length and curved slightly upward, first pointing nearly forward, third directed slightly posterior to a line perpendicular with axis of body, bending anteriorly before apex: disk closely and broadly punctured, with a small subtriangular area in middle impunctate, and apical portion transversely striated between dorsal spines. Scutellum broad, narrowed and rounded apically, finely punctulate. Elytra broadest near postero-lateral angles, slightly constricted behind base, rounded-truncate posteriorly; dorsal surface of each with ten rows of deep punctures besides a short scutellar row, armed with twenty-four distinct spines, including basal spines, but excluding some small subhumeral and posterior ones, mostly near suture; large post-basal spines arranged in four longitudinal rows, spines on basal margin one-half as long as humeral spines, which are subequal to larger posterior spines; lateral margins narrowly flattened; marginal spines seventeen in number,

lateral ones subequal, as long as one-half width of elytron, posterior spines a little shorter, minute spinules between some of marginal spines. Metasternum with a few punctures laterally; abdomen finely wrinkled and sparsely punctulate. Length 4.2 mm.; breadth 2.3 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Hau, alt. 175 meters, western Hainan Island, July 8, 1935, J. L. Gressitt.

Differs from *D. chaturanga* Maulik, of India, in being smaller, in having the prothorax with the dorsal spines more nearly straight, and the lateral spines more slender and less straight, the first pointing more anteriorly and the third more posteriorly, the coloration darker, etc.

12. *Dactylispa gestroi* n. sp. (pl. 11, fig. 4)

Body broad, subrectangular; ground color reddish-testaceous, elytra largely black; head reddish-testaceous in front, marked with piceous on lower part of frons; occiput and sides of head piceous; antennae pale reddish-testaceous, first two segments reddish-brown, piceous internally; prothorax reddish-brown, marked with piceous on either side of middle of disk, anterior border of pronotum and prosternum; scutellum dark rufous-piceous; elytra slightly shining, largely black, parts of areas between spines and margins in small part reddish-brown, remainder of margins and spines on posterior margins pitchy black; ventral surface of body brownish-testaceous; metathorax darker, pitchy brown laterally.

Head granulose-punctate on anterior portion of occiput; vertex with a minute projection between antennal insertions; frons no higher than width below, rugulose-punctate, medially carinate; eyes broadly ovoid, widest near middle. Antennae two-thirds as long as body, slightly thickened apically; scape slightly compressed, less punctate than second to fourth segments, nearly as long as following two segments combined; fourth and fifth subequal, each three-fourths as long as third; sixth shorter; seventh longer than fourth; eighth to tenth shorter; last as long as fourth; last six segments closely punctate, clothed with sparse golden hairs. Prothorax hardly more than one-half as wide as elytra, considerably broader than long; dorsal surface of anterior margin with a pair of widely separated spines bifurcating a short distance from bases, posterior spine of each group long and slender, directed slightly forwards, anterior branch three-fourths as long, slightly bent; lateral margins produced just behind anterior cylindrical portion, forming a common base for three long, slender, subsinuate spines; intermediate spine slightly longer, and posterior one a little shorter, than anterior spine; disk closely punctured, each puncture with a short golden brown hair. Scutellum broad, narrowed and rounded posteriorly, micro-punctulate. Elytra broad, rounded posteriorly, nearly straight at sides; disk of each elytron with about twenty-one major spines, eleven of which form paraescutellar-humeral semi-circle, post-basal spines

large, subequal and broad-based; interstices with broad serial punctures; margins narrowly expanded, each bearing about nineteen major spines besides a few minute spinules, spines on lateral margins long, flattened basally, those on apical margins short and broad, triangular. Ventral surface with a few punctures on abdomen and sides of metathorax. Length 5 mm.; breadth 2.8 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Han, alt. 750 meters, central Hainan Island, June 22, 1935, J. L. Gressitt.

Differs from *D. corpulentina* Uhmann in being broader and darker, with the pronotum more even and entirely punctured, the third lateral spine longer, the elytra more narrowly margined, the diskal spines less numerous and larger, the lateral marginal spines larger and more regular, the posterior marginal spines much more distinct, etc.

13. *Dactylispa longispina* n. sp. (pl. 11, fig. 5)

Body suboblong, nearly parallel, rounded posteriorly; testaceous, marked with piceous and black: head reddish-testaceous, rufopiceous above; antennae ochraceous, scape darker; prothorax pitchy black, reddish at apex and base, spines black with apices piceous; scutellum reddish-brown, slightly darker at sides; elytra testaceous, spines and bases black, suture and tips of spines piceous, spines on apical margins partly black; metasternum reddish, legs testaceous.

Head subrectangular in front, broadened behind eyes; occiput concave, microgranulose; vertex with a narrow projection between antennal insertions; frons deeper than wide, narrow and medially carinate above, swollen below middle, surface punctate, dull; eyes elongate-oviform, broadest above middle. Antennae three-fourths as long as body; scape subcylindrical, feebly arched, almost impunctate. second segment one-half as long as scape; third segment nearly as long as first two combined; fourth and fifth each two-thirds as long as third; seventh slightly longer than sixth or eighth, a little broader than long, subcylindrical apically; dorsal surface behind anterior margin with a pair of bifurcating spines, posterior spine of each group vertical, slender, fully as long as prothorax, with a minute anterior spinule one-third from apex, anterior spine two-thirds as long as posterior, forming an acute angle with latter; lateral margins expanded at middle, a group of three spines on each side, first two with a common base, branching a moderate distance from margin, curved slightly upward and bent slightly forward before apices, second longest, nearly as long as posterior dorsal spines, third about one-third as long as second and arising a short distance behind it; disk with a transverse, oblong raised area in middle, the surface of which is almost impunctate, medially grooved, opaque and microgranulose, surrounding area closely punctured and bearing a few pale hairs. Scutellum nearly as long as broad, narrowed and rounded posteriorly, micro-punctulate. Elytra grossly striate-punc-

tate; dorsal surface of each elytra with nineteen spines, including basal ones which are very small; major diskal spines in two rows, alternating, except for last three, which form a subtransverse row, all very long and slender, some nearly as long as width of elytron; suture bearing many small spinules; margins hardly expanded, that of each elytron bearing twelve or thirteen larger spines and a number of minute spinules, of which there are often two or three between two of the former, spines at middle of side as long as longer diskal spines, those on apical margin less than one-half as long. Ventral surface of body sparsely punctured. Legs moderately slender; femora with several spinules on lower surface. Length 5.4 mm.; breadth 2.9.

Holotype (United States' National Museum), Dome Mountain (Sa Ko Lia or Sa Bo Leng), alt. 350 meters, southwest of Nodoa, west central Hainan, July 13, 1935, J. L. Gressitt; paratype (Gressitt collection), Fan Ta, alt. 310 meters, southeast of Nodoa, July 17, 1935.

Differs from *D. sauteri* Uhmann, of Formosa, in being broader, less shining and partly testaceous or piceous dorsally, in having the pronotal swelling rougher and medially grooved, the first lateral spine of prothorax relatively shorter, the marginal spines of elytra less regular in length and position, and the metasternum red instead of black. Distinguished from *D. balyi* Gestro in having the spines longer, the prothorax piceous instead of red, the elytra partly testaceous, etc.

14. *Dactylispa nigrodiscale* n. sp. (pl. 11, fig. 6)

Body rectangular, moderately broad; prothorax with three spines in each anterodorsal group and three arising from each lateral margin. Ground color testaceous, disks of prothorax and elytra largely black or piceous; head reddish-testaceous; neck pitchy; antennae reddish-testaceous, first two segments piceous; prothorax testaceous with disk black, apical and basal margins and tips reddish-testaceous behind middle and apical margins rufo-piceous; ventral surface of body testaceous, metasternum dull; legs yellowish-testaceous.

Head broader than anterior margin of prothorax, constricted behind eyes; occiput dull, micro-granulose; post-occiput smooth and shining; vertex with a minute projection between antennal insertions; frons broadened below, convex, sparsely punctured; eyes strongly swollen, egg-shaped. Antennae three-fourths as long as body, moderately slender, striolate-punctate basally, finely clothed with short goldish hairs; scape moderately slender, slightly arched; second segment one-third as long as scape; third to seventh subequal in length, each three-fourths as long as scape; eighth to tenth shorter, cylindrical; last shorter than scape. Prothorax broader than long, slightly constricted behind lateral expansions, bearing a group of three spines on either side of middle of anterior margin, those of each group arising from a common base, hindmost branching off

first, nearly vertical, slightly bent beyond middle, anterior two spines projecting forward; bending slightly upward, second longer than first, as long as third; a group of three spines at each side, arising from an expansion of margin before middle, first two with a common base, subequal in length, third shorter, pointing slightly posteriorly; disk closely and broadly punctured, with three impunctate areas, one behind anterior spines, extending posteriorly to center of disk, remaining two minute, placed on either side of middle, a transverse depression crossing disk before middle. Scutellum broad, narrowed and subangulate posteriorly, finely granulose. Elytra nearly parallel-sided, broadly rounded posteriorly; surface with distinct, rounded punctures, armed with about twenty-two distinct spines besides some small ones behind middle, spines on basal margin short, a pair of adjacent spines on suture a short distance behind scutellum; margins flattened, bearing compressed spines of different lengths: each with five or six large spines on basal three-fourths of lateral margin, five or six medium-sized spines on apical margin and postero-lateral angles, besides one or two similar ones both below humeral angle and interspersed on lateral margin, thirdly, some small to minute slender spines alternating with larger spines. Abdomen wrinkled and finely punctured. Length 4.2 mm.; breadth 2.1 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Han, alt. 750 meters, central Hainan Island, June 23, 1935, J. L. Gressitt.

Differs from *D. horni* Gestro, of Ceylon, in being largely black above, slightly smaller in size, in lacking the median impressed line of prothoracic disk, in having spines of intermediate sizes on elytral margins, etc.

15. *Dactylispa pallidicolle* n. sp. (pl. 11, fig. 8)

Body suboblong, slightly broadened and rounded posteriorly; largely testaceous, slightly duller on elytral disks; major dorsal spines of elytra black, but bases of posterior spines testaceous and spines at humeral angles largely pale, their apices piceous; basal portion of suture and areas adjacent to scutellum narrowly pitchy black, marginal spines testaceous, lateral ones piceous apically, those at postero-lateral angles largely pitchy brown; ventral surface of body sparsely clothed with golden brown hairs, surface slightly brownish on metasternum.

Head broader than anterior margin of prothorax, moderately smooth above, a feebly longitudinal depression along middle of occiput; frons higher than wide, slightly broader below, shallowly punctured and slightly raised along middle; eyes oval, broadest at middle. Prothorax nearly one-half again as broad as long, expanded at middle of sides and constricted before base; anterior margin with a pair of long spines, each bifurcating near base, posterior branch longer, more nearly vertical, both bent slightly backward before

apices; lateral spines three on each side, all nearly straight, first two equal in length, arising from a single stem, first pointing nearly forward, second forming about a forty degree angle with former, third arising from middle of lateral expansion, nearly as long as first two and directed slightly anterior to a line at right angles with axis of body; disk with an impunctate, grooved, mid-longitudinal area, coarsely and shallowly punctured on either side, transversely impressed before base. Scutellum large, triangular, rounded posteriorly, microgranulose. Elytra two-thirds as broad as long, disk broadly punctured in nine rows, bearing about a dozen long spines, several medium sized, and a number of small ones; large posterior spines arranged in three rows, a pair of medium-sized spines close to suture a short distance behind scutellum; margins expanded, bearing about a dozen large, basally expanded spines on each side, irregularly interspersed with smaller ones, and five or six medium-sized spines and one or two spinules on apex of each. Metasternum finely striated transversely; abdomen wrinkled and irregularly punctured. Length 4 mm.; breadth 2.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Han, alt. 750 meters, central Hainan, June 23, 1935, J. L. Gressitt.

Differs from *D. corpulentina* Uhmann in being much paler, with the head and prothorax entirely yellowish testaceous, the elytra more extensively so with the marginal spines less regular at sides, much longer at apices, and the diskal spines fewer in number, etc.

16. *Dactylispa sinuispina* n. sp. (pl. 11, fig 7)

Body broad, subrectangular; color reddish-brown, black and testaceous: head reddish-brown; neck rufo-piceous; antennae reddish-ochraceous, clothed with short golden-brown hairs; prothorax testaceous with disk black, edged and medially striped with reddish, tips of spines piceous, scutellum ochraceous; elytra with disks reddish-brown, dorsal spines and their bases largely black, spines and margin on middle portion of each side testaceous, remaining lateral spines piceous, apical spines reddish; ventral surface testaceous, duller on metasternum and nearly black on mes- and metepisterna; legs testaceous.

Head broader than anterior margin of prothorax: occiput flattish, emarginate posteriorly, with a few punctures on each side next to eyes; frons as wide as deep, broader below, flattish at sides, slightly raised and punctured along middle; eyes oval, widest a little above middle. Antennae three-fourths as long as body, slightly thickened apically; scape thickest at middle, somewhat compressed, punctate, not quite as long as following two segments combined; second segment two-thirds as long as third; third to seventh subequal in length. Prothorax broad, bearing a pair of widely separated, long, laterally compressed, bifurcating spines, the posterior one of each pair longer, nearly vertical and feebly sinuate; sides with three

broad, flattened, tapering, sinuous spines arising from a wide, common base, first two subequal in length, third three-fifths as long; disk depressed before and behind middle, shallowly but distinctly punctured except on a mid-longitudinal granulose stripe and a smaller, oval area on each side of center. Scutellum wide, broadly rounded behind, finely granulate. Elytra broad, feebly constricted before middle; disk grossly punctured in nine or ten rows, spines large and broad-based, nine arranged in four longitudinal rows on each beyond basal third, basal spines fairly short, humeral spines rather long, latter four or five in number; lateral margins widely expanded, bearing basally flattened spines of varying length, with irregularly alternating minute spinules; spines on apical margins strongly flattened, but less than one-half as long as lateral spines. Ventral surface nearly smooth on metasternum, irregularly punctured on metepisternum and abdomen. Length 5 mm.; breadth 2.8 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Ta Han, alt. 750 meters, central Hainan, June 22, 1935, J. L. Gressitt.

Differs from *D. corpulentina* Uhmann in having the lateral prothoracic spines distinctly dorso-ventrally compressed and broadened, the lateral margins of the elytra more widely expanded and with the spines less regular in length and arrangement, the apical spines much longer, etc. Differs from *D. gestroi* Gressitt in being less parallel, with the lateral prothoracic spines longer and flatter, the pronotum with three impunctate areas, the elytra with the lateral spines shorter, stouter and more regular, etc.

17. *Dactylispa balyi* (Gestro)

Hispa Balyi Gestro, Ann. Mus. Civ. Genova 30 : 250, 1890 (Teinzo, Burma); 1 c. 1897 : 82.

Hispi discordalis Baly (nec Chapuis), Ann. Mus. Civ. Genova 26 : 664, 1888 (Teinzo, Burma).

Dactylispa balyi, Maulik, Fauna Brit. India, Col. : Hisp., Cassid. . 210, 1919

Two examples were collected: one at Fan Ta, alt. 300 meters, west central Hainan, June 3, the other at Ta Hau, alt. 180 meters, western Hainan, July 5, 1935, J. L. Gressitt.

18. *Dactylispa corpulentina* Uhmann

Dactylispa corpulentina Uhmann, Suppl. Entom. 16 : 113, 1927 (Kosempo, Formosa); Chujo, Trans Nat Hist. Soc. Formosa 23 : 325, 1933.

Four specimens of this species were collected on the island: three at Ta Han, alt 750 meters, June 22-24, and one at Dwa Bi (Tai Pin), alt. 350 meters, July 23, 1935, central Hainan, J. L. Gressitt.

19. *Dactylispa feae* (Gestro)

Hispa Feae Gestro, Ann. Mus. Civ. Genova 26 : 183, 1888 (Bhamo, Burma). *Dactylispa feae* Maulik, Fauna Brit. India, Col. : Hisp., Cassid. : 188, 1919

Four specimens were collected: one at Ta Hian, alt. 600 meters, foot of Five Finger Mountains, June 13, two at Ta Han, alt. 750

meters, June 22-24, and one at Chung Kon, alt. 290 meters, July 19, 1935, central Hainan Island, J. L. Gressitt.

20. *Dactylispa filiola* Weise

Dactylispa filiola Weise, Deutsche Ent. Zeits. 1897 : 135 (Kanara, India).
l.c. 1905 : 20; Maulik, Fauna Brit. India, Col. : Hisp., Cassid. : 199,
1919.

A single specimen, considered referable to this species, was taken at Ta Hau, alt. 180 meters, western Hainan, July 5, 1935, J. L. Gressitt.

21. *Dactylispa latispina* Gestro

Dactylispa latispina Gestro, Ann. Mus Civ. Genova 1899 : 228 (Tongking).

Two specimens were collected at Ta Hau, alt. 180 meters, western Hainan, July 4, 1935, J. L. Gressitt.

22. *Dactylispa longula* Maulik

Dactylispa longula Maulik, Fauna Brit. India, Col. : Hisp., Cassid. : 204,
1919 (Momeit, Burma).

A single specimen was taken at Ta Hau, alt. 180 meters, western Hainan, July 8, 1935, J. L. Gressitt.

Key to Hainan Species of *Dactylispa*

- A. Prothorax with a pair of bifurcating spines on dorsal surface near anterior margin, and a group of three spines arising from each lateral margin B
Prothorax with each antero-dorsal group consisting of three spines, lateral groups of three or four spines each..... K
- B. Pronotum with a large, transverse, raised, medially grooved, smooth area in middle of disk; some of prothoracic spines with minute spinules C
Pronotum lacking a large, smooth, transverse, swollen area..... E
- C. Elytra pale, with spines and their bases black; antennae testaceous.... D
Elytra black; pronotum and scutellum reddish; antennae piceous..... balyi (Gestro)
- D. Elytral margins expanded at bases of spines; no spinules alternating with major spines; prothorax testaceous, with tips of spines black; scutellum black longula Maulik
Elytral margins not expanded; minute spinules alternating with major spines; prothorax piceous, spines black, piceous apically; scutellum rufo-piceous longispina Gressitt
- E. Elytral margins not expanded; lateral prothoracic spines arising from a single trunk, first two separating some distance from base .. F
Elytral margins expanded; lateral prothoracic spines arising separately, or at least not slender and attached at a single point; spines on elytral apices short and broad G
- F. Pronotal disk black, entirely punctate, plane; prothoracic spines reddish; elytral spines black or piceous; abdomen testaceous... filiola Weise
Pronotum testaceous, each side of middle of disk piceous; disk irregular; prothoracic spines testaceous basally, blackish apically; elytral spines mostly black, some smaller and testaceous, tipped with piceous; abdomen blackish feae (Gestro)
- G. Pronotum with a median, finely grooved, impunctate, longitudinal stripe, with remainder of disk, except margins, densely punctured; lateral

- prothoracic spines extending beyond humeri; antennae more than two-thirds as long as body; ground color reddish-testaceous H
- Pronotum either entirely punctured or with five oval, raised impunctate areas arranged transversely; lateral prothoracic spines not extending beyond humeri; antennae less than two-thirds as long as body; elytra largely black or pitchy red J
- H. Lateral prothoracic spines slender, gradually tapering, round in cross-section; lateral margins of elytra with occasional short spines between pairs of major spines; apical spines moderately slender, or minutely triangular I
- Lateral prothoracic spines broad and flattened basally; lateral margins of elytra broadly expanded, with minute spinules on either side of short spines between major spines, apical margins with moderately short, broad spines; elytra reddish-brown with diskal spines black and middle of lateral margins testaceous *sinuispina* Gressitt
- I. Punctate portion of pronotum black; third lateral prothoracic spine less than three-fourths as long as first or second spines; spines on lateral margins of elytra piceous; apical elytral spines minute, triangular....
..... *corpulentina* Uhmann
- Pronotum entirely testaceous; third lateral prothoracic spines nearly as long as first or second spine; spines of lateral margins of elytra testaceous except at apices; apical elytral spines nearly one-half as long as lateral spines, feebly expanded. *pallidicollis* Gressitt
- J. Elytra parallel, margins evenly expanded; spines on prothorax and lateral margins of elytra nearly cylindrical *gestroi* Gressitt
- Elytra not parallel, margins widely expanded before and behind middle; spines on prothorax and elytral margins short and flattened; pronotal disk with five raised areas in a transverse row *latispina* Gestro
- K. Prothorax with four spines at each side; pronotal disk reddish with a blackish area on either side of middle; elytra broadened posteriorly, reddish-brown with black spines and spots surrounding their bases, marginal spines uniform, shorter at apices, mostly reddish with black tips *atracumina* Gressitt
- Prothorax with three spines at each side; pronotal disk pitchy black; elytra parallel-sided, black with pitchy or reddish margins, marginal spines of at least three sizes, irregularly arranged; pitchy black or reddish-brown *nigrodiscalis* Gressitt

Genus *Platypria* Guerin, 1840

23. *Platypria alces*' n. sp. (pl. 11, fig. 9)

Broad, with strong lobes and long slender spines at sides; ground color testaceous, dorsal surface largely marked with black or piceous. head dull reddish-testaceous, labrum black, occiput black in middle of posterior part; antennae testaceous, two basal segments nearly ochraceous; pronotum testaceous, spines tipped with piceous, disk reddish-testaceous, blackish on basal half, anterior margin and midline; scutellum black; elytra largely blackish, each with suture, parts of ribs in inter-spinal areas of disk, middle portion of compressed lateral margin, basal halves of posterior two spines of anterior marginal lobe, extreme apices and three attached spines

* *Alces* is the moose genus, and is used for this species because of the resemblance of the spined lobes of the prothorax to the horns of a moose.

yellowish-testaceous, tips of latter piceous; ventral surface of body testaceous. Pronotum and elytra, including lateral spines of both, clothed with sparse, pale hairs.

Head short, broader than anterior margin of prothorax; labrum transverse, emarginate; frons fully as deep as wide, slightly broader below, strongly convex and rugulose-punctate; occiput squarish, micro-granulose, deeply grooved posteriorly along mid-line; eyes oblong-oval, twice as deep as wide; neck short, constricted. Antennae two-thirds as long as body, slightly thickened apically; scape twice as long as broad, swollen, subcylindrical; second segment about one-half as long as scape; third slender, longer than two preceding combined; fourth one-half as long as third; fifth to eighth gradually shorter; ninth three-fourths as long as third; last few clothed with fine pale golden pubescence. Prothorax broader than long; base nearly twice as broad as apex; sides broadly expanded into long, obliquely transverse lobes, each bearing four long, slender, subequal spines and one or two short ones, first long spine arising near base of lobe, pointing forward and slightly inward, second directed nearly forward, last two arising at end of lobe, third forming about a forty-five degree angle with axis of body, fourth extending transversely, bending slightly forward; a small spine, about one-third as long as major spines, forming posterior extremity of lobe, sometimes a minute spine at base of anterior edge of lobe, pointing inward and upward over disk; disk entirely rugulose punctate, transversely depressed before base. Scutellum large, narrowed and broadly rounded posteriorly, concave in middle, central portion rugulose. Elytra broad; margins widely flattened, with a large lobe before and behind middle, anterior lobe bearing five long, slender spines, the last directed obliquely backward and curving outward, posterior lobe bearing three long spines, a medium-sized spine on margin between lobes; apical margin with five spines decreasing in size toward sutural angle, and a small tooth on the angle; disk of each with about eleven large spines of varying length, and some smaller ones, two of the former on humerus, following one or two smaller spines; surface with nine or ten rows of large, flat-bottomed punctures, second and third, and fourth and fifth rows, respectively, divided by wide, raised costae. Ventral surface nearly impunctate; abdomen slightly wrinkled; posterior femora reaching to last abdominal segment. Length 5.2 mm.; breadth 5.

Holotype (United States National Museum), Ta Hau, alt. 190 meters, western Hainan Island, July 5, 1935; paratype (Gressitt collection), Ta Hian, alt. 600 meters, near Five Finger Mountains, south central Hainan, June 19, 1935, J. L. Gressitt.

Differs from *P. hystrix* (Fabr.) in being darker, with the lateral prothoracic expansions much longer and narrowed, with longer and more slender spines, the last longer than in *hystrix*, but arising a long distance from apex of preceding; elytra generally with four

humeral spines, spines on lateral lobes longer and more slender and apical spines gradually decreasing in length.

海南島之鐵甲虫
(鞘翅目：金花虫科：鐵甲虫亞科)
嘉思理著
• 嶺南大學自然博物採集所
(摘要)

作者於民國廿四年，在海南島採得鐵甲虫二十三種。所述各種，皆首次發見於於海南。現經描述為新種者有下列十種：
Callispia dimidiatipennis recticollis n. subsp., *C. fortuneii emarginata* n. subsp., *Oncocephala atratangula*, *Dactylispa atracumina*, *D. gestroi*, *D. longispina*, *D. nigrodiscale*, *D. pallidicolle*, *D. sinuispina*, 及 *Platypria alces*. 至於 *Callispia* 及 *Dactylispa*. 屬之品種檢索表，亦見文中。

Explanation of Plate

(All figures greatly enlarged)

Fig. 1. *Oncocephala atratangula* Gressitt, lateral view of left elytron.

2. *Oncocephala atratangula* Gressitt, dorsal view of dorsal cephalic protuberance.

3. *Dactylispa atracumina* Gressitt, dorsal view of prothorax and head.

4. *Dactylispa gestroi* Gressitt, same.

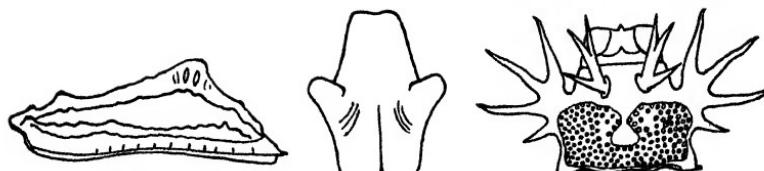
5. *Dactylispa longispina* Gressitt, same.

6. *Dactylispa nigrodiscale* Gressitt, same.

7. *Dactylispa sinuispina* Gressitt, same.

8. *Dactylispa pallidicolle* Gressitt, same.

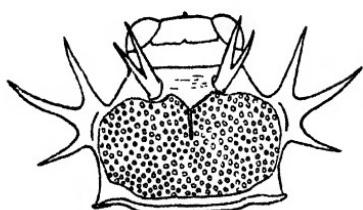
9. *Platypria alces* Gressitt, same.



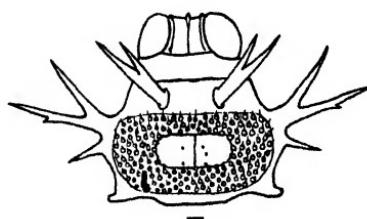
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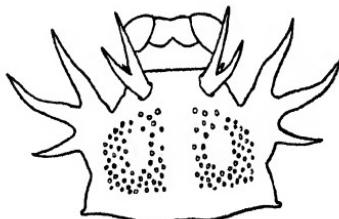
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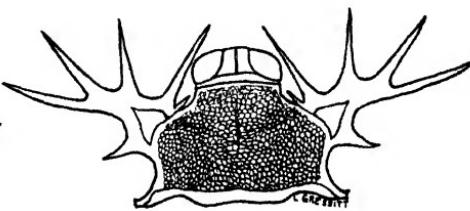
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STUDIES ON THE TIPULIDAE OF CHINA (DIPTERA)**II. New or little-known Crane-flies from southeastern China**

By CHARLES P. ALEXANDER

Massachusetts State College, Amherst, Massachusetts.

The first part under this general title was published in the Lingnan Science Journal, Vol. 11:505-508, November 1932. In the present instalment I wish to discuss some interesting material received through the continued friendly interest of my friend, Professor William E. Hoffmann, derived from various sources but chiefly from the Province of Kwangtung including Hainan Island. The types of the novelties herewith described are eventually to be returned to the Lingnan Natural History Survey and Museum, but acting on the suggestion of Professor Hoffmann, Director of the Museum, I am retaining this material for the present, while returning the duplicate series to Canton. I wish to express my deep thanks to Professor Hoffmann, Mr. Ernest R. Tinkham and Mr. F. K. To, collectors of almost all of the species discussed. Our knowledge of distribution of the Tipulidae of the various provinces of eastern China is still very incomplete and it is especially gratifying to have available for study a collection of the importance of the present one.

Tipulinae**1. *Ctenophora pselliophoroides* n. sp. (fig. 1)**

General coloration yellow, the mesonotum variegated with brown; antennae (male) elongate, the branches long and slender, the outer pair about two-thirds the length of the basal pair; basal branches with conspicuous spinous setae, additional to the erect vestiture; wings yellow, prearcular, costal and stigmal regions deeper yellow; Rs long, about three times $m-cu$; cell M_1 broadly sessile; male hypopygium with the dististyle terminating in a slender curved spine.

Male.—Length, about 16 mm.; wing, 13 mm.; antenna, about 6.2 mm.

Frontal prolongation of head reddish, short and stout; nasus very broad, the apex subtruncate to feebly emarginate; palpi with basal segment yellowish-brown, remainder black. Antennae elongate; scape and pedicel yellow; axis of basal seven flagellar segments yellow, especially on outer portion, the base more infuscated to blackened, the outer segments with the axis uniformly blackened; all branches black; flagellar branches elongate, on outer segments the outer pair about two-thirds as long as the basal pair; on second

flagellar segment, outer branches about one-half the basal ones; branches clothed with coarse erect setae, the basal branches with additional stout yellow spinous setae, especially strong and conspicuous on branches of second flagellar segment where they total seven or eight in number, scattered over the whole length of the branch; on outer segments, these spines longer and more bristle-like but still very conspicuous. Head reddish, the anterior vertex with a broad black transverse band connecting the eyes behind the antennal fossae; head with coarse black setae.

Pronotum yellow. Mesonotal praescutum obscure yellow with three more brownish stripes that are rather poorly defined; scutum obscure yellow, each lobe with an oblique line, converging behind to scutellum, the lateral depressed areas of scutal lobes blackened; scutellum dull black; mediotergite yellow, with a median brown triangle, the point directed cephalad. Pleura yellow, the anepisternum darker; pleurotergite yellow, with a brown spot on posterior border. Halteres with stem yellow, knob weakly darkened. Legs reddish-yellow, the outer tarsal segments blackened. Wings (fig. 1) yellow, prearcular field and cells C and Sc , especially the latter, deeper yellow; stigma deep yellow, the posterior border darker; veins dark brown. Venation: Rs long, approximately three times $m-cu$ and longer than the distal section of vein R_{4+5} ; cell M_1 broadly sessile.

Abdominal tergites reddish-yellow, the more basal segments narrowly ringed with blackish; intermediate tergites with a heavy vestiture of yellow setae; hypopygium large, reddish, the tergal lobes black. Hypopygium of the dried type with the tergite massive, the large lateral lobes separated by a very deep and narrow median incision. Dististyle reddish, the dorsal end terminating in a slender curved spine jutting into the tergal notch. From the apex of the basistyle jut caudad conspicuous yellow lobes fringed with long yellow hairs that appear to be microscopically roughed or feebly branched, the lobes irregularly bilobed, the lower or mesal lobe directed mesad.

Hab. China (Kwangtung).

Holotype, ♂, Keung Tin Heung, Lien District, July 13-14, 1934 (F. K. To).

I prefer to place the present fly in *Ctenophora* rather than in *Pselliophora* because of the great length of Rs and the markedly unequal flagellar branches. However, in the long antennae and the slenderness of the branches, the fly strongly suggests species of *Pselliophora*, whence the specific name. The most similar species is the Japanese *Ctenophora septentrionalis* (Alexander) which lacks the modified spines on the basal flagellar branches and has a very different hypopygium.

2. Pselliophora ardens (Wiedemann)

1821. *Ctenophora ardens* Wiedemann, Dipt. exot. 1 : 20.

Female, Hainan Island, Tai-pin-ts'u'en, Lam-ka-heung, Lai-mo-ling (mountain range), Kiung-shan District, April 28-30, 1935 (F. K. To).

Female, Kwangtung, Shek Pik, Lan-tau Island, near Hong Kong, August 12, 1934 (Y. W. Djou).

I cannot separate these specimens from authentic Javan material.

3. Pselliophora bifasciipennis Brunetti

1911. *Pselliophora bifasciipennis* Brunetti, Rec. Indian Mus. 6 :241-242.

1916. *Pselliophora sackeni* Edwards, Ann. & Mag. Nat. Hist. (8)18 :257.

1916. *Dictenidia Horikawa* Matsumura, Thousand Ins. Japan, Add. 2 · 449-450.

1921. *Pselliophora compta* Enderlein, Zool. Anzeig. 52 :220-221.

KWANGTUNG: Wui Tung, July 27, 1933 (M. H. Cheng: Cheng Men Hao), male. Honam Island, P'an-yu District, Canton, September 27, 1931 (W. E. Hoffmann), female.

4. Pselliophora sternoloba n. sp. (fig. 2, 6)

General coloration orange; antennae yellow, the terminal three segments and all branches black; halteres yellow, the knobs weakly darkened; femora yellow, the tips weakly darkened; posterior tibiae with about the basal third yellowish-white, the remainder darker yellow; wings yellow with a major dark brown subapical area, lying chiefly in outer radial field; basal abdominal tergites with caudal borders narrowly blackened; male hypopygium with the eighth sternite produced into a conspicuous prow-shaped median lobe, the outer portion densely clothed with short black setae.

Male.—Length, about 17 mm.; wing, 15 mm.; antenna, about 7 mm.

Frontal prolongation of head, with the nasus, uniformly yellow; palpi with basal three segments yellow, the terminal segment dark brown. Antennae long; main axis of basal ten segments yellow, the outer segments and all branches black; branches elongate, with delicate erect white setae. Head orange.

Thoracic dorsum uniformly orange; praescutum glabrous; outer portions of scutum, laterad of lobes and cephalad of parascutella with a dense brush of brownish-yellow setae; a more sparse group on lateral portion of scutal lobes above the wing-root; scutellum with straggly long yellow setae; mediotergite with a group of yellow setae on either side. Pleura yellow, glabrous. Halteres yellow, the knobs weakly darkened. Legs with the coxae and trochanters yellow; femora yellow, the tips weakly darkened; tibiae brownish-yellow, the tips darker; tarsi passing into dark brown; posterior tibiae with

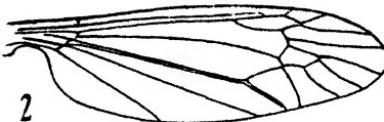
about the basal third yellowish-white, the remainder darker yellow. Wings (fig. 2) yellow, the prearcular and costal portions more saturated; a conspicuous subapical brown area in outer radial field, occupying more than the basal half of cells R_3 and R_4 and adjoining portions of cells R_2 , 1st M_2 and M_1 , together with the contiguous stigma; axilla infuscated; veins brown, yellow in the more saturated flavous portions. Venation: Rs arcuated, a little longer than $m-cu$; cell M_1 narrowly sessile; cell 1st M_2 pointed at outer end.

Abdomen orange, the caudal borders of tergites one to three, inclusive, narrowly blackened; subterminal sternites more or less blackened; hypopygium orange. Male hypopygium (fig. 6) with the eighth sternite projecting in a long prow-shaped or boat-shaped lobe, the outer portion densely set with short black setae; ventral surface of lobe with pale membrane, the apex broadly obtuse and feebly notched; on the more basal and lateral portions, the setae are longer,

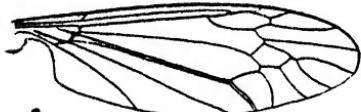
Fig. 1



2



3



4



5



6



Fig. 1, *Ctenophora pselliophoroides* n. sp., venation; fig. 2, *Pelliophora sternoloba* n. sp., venation; fig. 3, *P. furcolimbata* n. sp., venation; fig. 4, *P. jubilata* n. sp., venation; fig. 5, *Tisula (Orcomyza) clinata* n. sp., venation; fig. 6, *Pelliophora sternoloba* n. sp., male hypopygium, lateral aspect.

golden-yellow. Ninth segment short-cylindrical, tilted at an angle to remainder of abdomen. Ninth tergite extensive, heavily blackened, the median portion profoundly incised, the margins polished, glabrous. What appears to represent the mesal edge of the dististyle juts caudad and dorsad from the genital chamber as an acute black spine, the bases close together, the tips divergent; remainder of dististyle appearing as obtuse rounded lobes, with dense brushes of golden yellow setae.

Hab. China (Hainan Island).

Holotype, ♂, Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (mountain range), Kiung-shan District, April 22-30, 1935 (F. K. To).

Pselliophora sternoloba is most nearly related to the Japanese *P. galeata* Alexander, which has the eighth sternite somewhat similarly produced but is otherwise quite distinct. This condition of the sternite represents the maximum production of the segment so far discovered in the genus.

5. ***Pselliophora fuscolimbata* n. sp. (fig. 3)**

General coloration velvety black; abdominal segments two and three, with parts of four, reddish-orange; halteres and legs black, at least the posterior tibiae with white subbasal rings; wings weakly darkened, all veins and the outer border conspicuously margined with darker brown.

Female.—Length, about 23 mm.; wing, 16 mm.

Frontal prolongation of head short, black; nasus elongate; palpi black. Antennae with scape and pedicel black; flagellum broken. Head dull velvety black.

Thorax uniformly dull velvety black; setae of praescutal inter-spaces small and sparse. Halteres black throughout. Legs black; only a single leg (posterior) remains, this with a narrow, dirty white tibial ring about its own width beyond base. Wings (fig. 3) with the ground-color weakly darkened, all veins with broad, conspicuous, darker brown seams, least distinct on vein 2nd *A*; apical border of wing similarly margined with brown; cells *Sc*, *Cu₁* and the small narrow stigma darker brown; veins pale brown. Venation: *R₂* perpendicular or even directed slightly basad; vein *R₁* in stigmal area deflected strongly toward costa; vein *R*, shorter and less extended than in *præfica* or its subspecies *fenestrella*; cell *M₁* short-petiolate.

Abdomen with basal tergite velvety black; tergites two and three, together with basal and apical rings of tergite four, reddish-orange; the corresponding sternites similarly colored, except the darkened posterior border of sternite four; remainder of abdomen, including genital shield, velvety black.

Hab. China (Hainan Island).

Holotype, ♀, Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (mountain range), Kiung-shan District, April 16-19, 1935 (F. K. To).

The present fly has the wing-pattern almost exactly like that of *Pselliophora præfica fenestrella* Alexander, of the island of Samar, Philippines. The latter fly differs conspicuously in the uniform black color of the body. As is the case in several allied forms, it is virtually certain that the wing-pattern of the male of the present fly

will be found to differ from the female in being more uniformly darkened, though presumably the centers of at least some of the cells will be found to be pale.

6. **Pselliophora jubilata** n. sp. (fig. 4)

General coloration black, only the second and third abdominal segments restrictedly orange; wings brown, the prearcular and costal regions darker brown; a broken white crossband before cord; other whitish areas before cord, including the broad axilla; basal section of vein M_4 long.

Female.—Length, about 19 mm.; wing, 14 mm.

Frontal prolongation of head black; nasus stout; palpi black. Antennae with scape and pedicel black; flagellum broken. Head black

Thorax uniformly black, the surface opaque; setae of praescutal interspaces very sparse and small, those of scutellum long and conspicuous. Halteres black. Legs black; tibiae with a narrow white subbasal ring, slightly wider on the tibiae than on the middle; posterior legs broken. Wings (fig. 4) with the ground-color brown, the prearcular and costal regions, with the stigma, darker brown; a broken whitish crossband before cord, including separate areas before stigma in cells R and R_1 , in outer end of cell M and a smaller area in cell Cu ; axilla broadly whitened, including nearly the basal half of cell 2nd A and the restricted adjacent portions of cells Cu and 1st A ; a small spot in cells R and M beyond arculus; a white area in cell 1st A near vein 2nd A ; centers of cells R , to 2nd A , inclusive, together with cells R and M , slightly paler than their margins, this presumably a character of the female sex only; veins brown, Rs pale yellow where traversing the discal band. Venation: R , relatively long, considerably exceeding Rs ; $r-m$ short; cell M_1 , narrowly sessile; basal section of M_4 long; cell M_3 , relatively long, narrower at margin than at base.

Abdomen dull velvet black, segments two and three chiefly orange; outer segments with coarse erect setae on median portion near margin; genital shield black.

Hab. China (Kwangtung).

Holotype, ♀, Yam Na Shan, about 50 li SE-E. of Ping Chuen, Mei District, September 13-18, 1933 (F. K. To).

Pselliophora jubilata is allied to *P. hoppo* Matsumura, differing in the coloration of the body and wings, with the whitish color of the latter restricted to the cells basad of the cord. The pale wing-markings are definitely white, not light yellow as in *P. bifasciipennis* Brunetti.

7. **Tipula (Yamatotipula) nova** Walker

1848. *Tipula nova* Walker, List Dipt. Brit. Mus 1 : 71.

Wide-spread in eastern and southern Asia.

KWANGTUNG: White Cloud Mt., Canton, March 19, 1933, April 22, 1934 (E. R. Tinkham), May 21, 1933 (Y. T. Feng). Shiu-chow, Kuh-kiang District, March 26, 1933 (T. Y. Chue). Ting Wu Shan, Kao-yao District, April 6-7, 1934 (E. R. Tinkham). Honam Island, Canton, P'an-yu District, April 8, 1936 (E. R. Tinkham).

FUKIEN: Yen-ping, Nan-ping District, June, July 1933 (D. C. Ngu).

8. **Tipula (Oreomyza) clinata** n. sp. (fig. 5)

Allied to *arisaniensis*; mesonotum dark, sparsely pruinose; praescutum with three reddish-brown stripes; outer flagellar segments uniformly darkened; halteres dark; femora obscure yellow, the tips narrowly dark brown; wings brown, variegated with cream-yellow areas, including an incomplete band beyond stigma; R_{1+2} entire; $m-cu$ at near two-thirds the length of M_{3+4} ; abdominal tergites brownish-black, the caudal-lateral margins paler; genital segment black.

Female.—Length, about 11 mm.; wing, 10.5 mm.

Frontal prolongation of head brown, darker beneath; nasus distinct; palpi brownish-black. Antennae with scape and pedicel obscure yellow; basal flagellar segments brownish-yellow, outer segments uniformly dark brown to brownish-black. Head dark brown in central portion, variegated near orbits with obscure yellow.

Pronotum gray, variegated with brown. Mesonotal praescutum with the ground-color dark, weakly pruinose, with three dark reddish-brown stripes: posterior sclerites of notum brown, the surface sparsely pruinose. Pleura brown, the dorsopleural region more obscure yellow; pleurotergite heavily gray pruinose on ventral protuberance. Halteres dark brown, the base of stem restrictedly yellow. Legs with the coxae brownish-gray; trochanters obscure yellow; femora obscure yellow, the tips narrowly dark brown; tibiae obscure yellow, the tips darkened; tarsi black. Wings (fig. 5) with the ground-color brown, conspicuously variegated by small cream-yellow areas, including an incomplete band beyond stigma; pale spots in all major cells basad of cord; cells C and Sc uniformly brownish-yellow; bases of cells R and M darkened, followed by a large common pale area; centers of outer medial cells less distinctly pale; veins brown. Venation: R_{1+2} entire, with sparse trichia; cell M , deep; $m-cu$ some distance before fork of M_{3+4} so the second section of this vein is about one-third to two-fifths the basal section.

Abdominal tergites chiefly dark brown or brownish-black, the basal segment paler; caudo-lateral borders of tergites broadly paler;

sternites brown; genital segment black. Cerci relatively slender, margins smooth.

Hab. China (Kwangtung).

Holotype, ♀, Loh Fau Shan, Wa Shau T'oi, altitude 800 feet, August 15, 1933 (E. R. Tinkham).

Tipula (Oreomyza) clinuta is similar and apparently allied to *T. (O.) arisanensis* Edwards, of the higher mountains of Formosa. The general appearance and venation, especially the position of *m-cu*, is characteristic of a small group of *Oreomyza* in Eastern Asia. The present fly is well-distinguished from other small species of this group by the details of venation and by the more variegated wing-pattern.

9. *Nephrotoma sinensis* (Edwards)

1916. *Pachyrrhina sinensis* Edwards, Ann & Mag. Nat. Hist. (8) 18 : 268-269.

Widely-distributed in China.

KWANGTUNG: Honam Island, Canton, P'an-yu District, May 23, 1931 (K. C. Yeung), May 4, 1932 (Chung Hang), May 14, 1934 (E. R. Tinkham).

Cylindrotominae

10. *Stibadocerella omeiensis* Alexander

1936. *Stibadocerella omeiensis* Alexander, Phil. Jour. Sci. 60 :335-336.

Described from Mount Omei, Szechwan, western China.

One somewhat teneral male that cannot be differentiated from the type. Loh Fau Shan, Kwangtung, Big Pool, altitude about 2800 feet, July 22, 1935 (E. R. Tinkham). This is the first record of a member of this genus from southeastern China.

Limoniinae

11. *Limonia (Libnotes) lantauensis* n. sp. (fig. 7)

Belongs to the *forcipata* group; general coloration of thorax reddish-brown, the pronotum and cephalic end of praescutum narrowly blackened; basal flagellar segments yellow, remainder of antennae dark; knobs of halteres dark; legs dark brown, the femoral bases yellow; wings yellow, the base and prearcular region light yellow, the veins conspicuously sordid with brown; *Rs* gently arcuated, exceeding twice the basal section of *R₄₊₅*; *m-cu* close to fork of *M*; male hypopygium with the tergite deeply notched medially; rostral spines very unequal; mesal apical lobes of gonapophyses long and slender.

Male.—Length, about 5.5 mm.; wing, 6.5 mm.

Female.—Length, about 7-7.5 mm.; wing, 6.5-7 mm.

Rostrum black, sparsely pruinose; palpi black. Antennae with scape dark brown; pedicel brown; basal flagellar segments yellow, the outer segments passing into brown; flagellar segments oval, with long verticils. Head dark brown, sparsely pruinose; anterior vertex reduced to a linear light gray strip that is less than twice the diameter of a single row of emmatidia.

Pronotum narrowly brownish-black above, more reddish on sides. Mesonotum reddish-brown, the praescutum with ill-defined more reddish stripes, the cephalic portion of the median stripe deepening to black. Pleura reddish-brown. Halteres with stem obscure yellow, the knobs infuscated. Legs with the coxae and trochanters reddish-brown; remainder of legs dark brown, the femoral bases obscure yellow. Wings (fig. 7) with the ground-color yellow, the prearcular field and costal border clear light yellow; a relatively conspicuous brown pattern, as follows: subcircular stigma; narrow but conspicuous seams along veins R_s , cord, all longitudinal veins beyond cord, tip of 1st A and all but basal portion of 2nd A ; cell Cu_1 , between the branches of Cu , even more broadly and conspicuously darkened; wing-tip narrowly infuscated; veins yellow, darker in the infuscated portions. Venation: Sc long, Sc_1 ending beyond the fork of R_s , Sc_2 some distance from its tip; R_s relatively long, gently arcuated, exceeding twice the basal section of R_{1+2} ; free tip of Sc_2 and R_2 in transverse alignment; cell 1st M_2 rectangular, a little longer than vein M , beyond it; $m-cu$ just beyond fork of M , longer than the distal section of Cu_1 ; Anal veins divergent.

Abdomen obscure yellow or brownish-yellow; sternites more or less darkened; restricted dark lateral spots at the incisures; hypopygium yellow. Male hypopygium with the tergite deeply notched medially; apex of each lobe with about three very strong setae; shorter additional setae, chiefly along the caudal margin. Basistyle smaller than the ventral dististyle. Rostral spines very unequal in size, the outer about one-half longer than the inner and much stouter; a group of small setae on face of style near base of the prolongation. Gonapophyses with mesal-apical lobe long and slender, the apex blackened. Cerci slender, tips simple.

Hab. China (Kwangtung).

Holotype, ♀, Lan-tau Island, near Hong Kong, August 7-9, 1934 (W. E. Hoffmann). Allotopotype, a broken ♂, with type. Paratopotype, ♀, Tung Chung, Lan-tau Island, August 7, 1934 (Y. W. Djou).

By Edwards's key to the species of *Libnotes* (Jour. Fed. Malay St. Mus. 14:74-80, 1928), the present fly runs to *Limonia (Libnotes) indica* (Brunetti). The species is quite distinct from *indica*, *forcipata* (de Meijere) or from any of the numerous species more recently defined.

12. *Nipponomyia kulingensis* Alexander

1937. *Nipponomyia kulingensis* Alexander, Notes d'Entomologie Chinoise, Musée Heude, Shanghai, vol 4, fasc. 5 : 73-74.

The type, a female, was from Kuling, collected August 18, 1935, by the Reverend Mr. Octave Piel. One broken specimen of uncertain sex in the present series is from this same locality, July 23-26, 1933 (Y. W. Djou).

13. *Pseudolimnophila inconcussa* (Alexander)

1913. *Limnophila inconcussa* Alexander, Can. Ent. 45 : 313-314.

Wide-spread in eastern Asia. KWANGTUNG: Wui-tung, Lingnan Agricultural Experiment Station, Chung-shan District, March 9-12, 1935 (H. Fung).

14. *Hexatoma (Eriocera) toi* n. sp. (fig. 8)

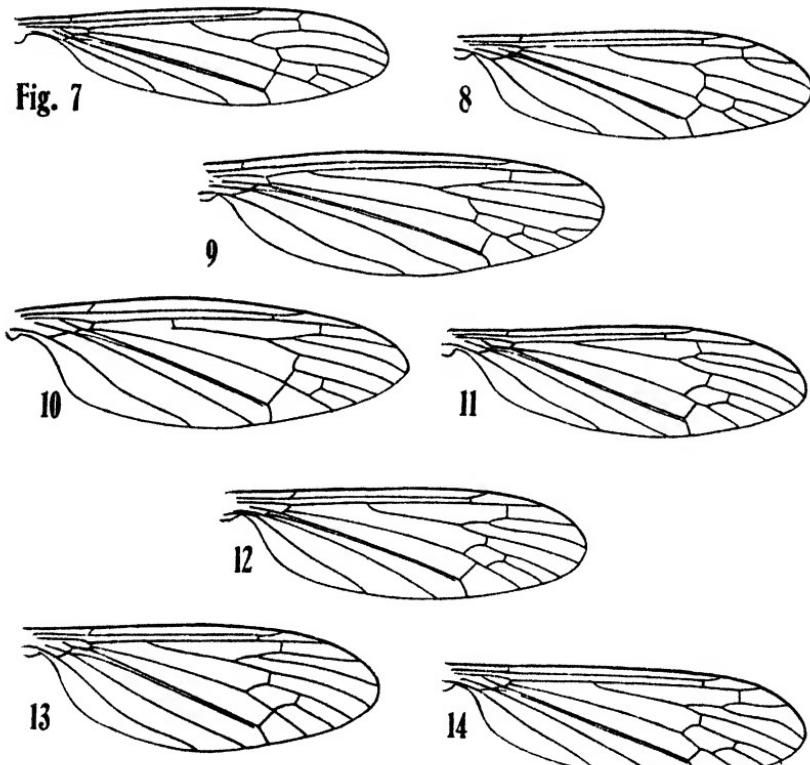


Fig. 7, *Limonia (Libnotes) lantauensis* n. sp., venation; fig. 8, *Hexatoma (Eriocera) toi* n. sp., venation; fig. 9, *H. (E.) longradialis* n. sp., venation; fig. 10, *H. (E.) scalaris* n. sp., venation; fig. 11, *H. (E.) tiukhami* n. sp., venation; fig. 12, *H. (E.) hoffmanni* n. sp., venation; fig. 13, *H. (E.) monoleuca* n. sp., venation; fig. 14, *H. (E.) bifenestrata* n. sp., venation.

General coloration gray, the praescutum with three subnitidous black stripes; halteres and legs black; wings brown; costal border darker brown; stigma very small, dark brown; macrotrichia on outer longitudinal veins; R_2 shortly before fork of R_{2+3} ; cell 1st M_2 rectangular, subequal in length to vein M , beyond it.

Female.—Length, about 13 mm.; wing, 10.2 mm.

Rostrum and palpi black. Antennae with scape and pedicel black; flagellum broken. Head dull gray; vertical tubercle bifid at summit.

Mesonotal praescutum gray, with three subnitidous black stripes; posterior sclerites of notum gray, the scutal lobes a little darkened; mesonotal setae relatively long and conspicuous but sparse. Pleura dark, gray pruinose. Halteres black. Legs black throughout. Wings (fig. 8) with a brown tinge, cells C and Sc , with the anterior prearcular field, darker brown; stigma very small, oval, still darker brown, appearing as a seam on vein R_1 before the union of R_2 ; some of the longitudinal veins narrowly and insensibly bordered by darker; veins brown, those of outer medial field paler. Trichia of costal fringe abundant; numerous trichia on outer radial veins and on anterior branch of M , lacking on the more posterior veins. Venation: R_s a little longer than R ; R_{2+3+4} longer than R_s ; R_2 shortly before fork of R_{2+3} ; cell 1st M_2 rectangular, subequal to vein M , beyond it; $m-cu$ at near one-fifth the length of cell 1st M_2 , longer than $m-cu$.

Abdomen black, the surface subnitidous; genital shield abruptly orange; ovipositor with very long slender cerci.

Hab. China (Hainan Island).

Holotype, ♀, Sam-kwong-ts'uen, Lam-wan-tung (Loi territory), Kiung-shan District, August 5-6, 1935 (F. K. To)

I take pleasure in naming this distinct fly in honor of the collector, Mr. F. K. To, who was largely instrumental in building up the series of *Tipulidae* discussed at this time. By Edwards's key to the Old World species of *Eriocera* (Ann. & Mag. Nat. Hist. (9) 8: 70-78, 1921) the present fly runs to *Hexatoma* (*Eriocera*) *nigrina* (Riedel) of Formosa, which differs in the larger size, coloration of the body and wings and in the details of venation, as the position of R_2 beyond the fork of R_{2+3+4} and the broader cell 1st M_2 .

15. *Hexatoma* (*Eriocera*) *longiradialis* n. sp. (fig. 9)

Mesonotal praescutum with the ground-color dull gray, with four polished blue-black stripes that are narrowly bordered by velvety black; scutal lobes similarly colored; antennae (female) 11-segmented, black to brownish-black; halteres and legs black; wings strongly tinged with reddish-brown; macrotrichia on outer radial veins; R_s long, exceeding twice the length of R ; R_{1+2} and R_{2+3+4} subequal in length; cell M_1 present; $m-cu$ at or beyond midlength

of lower face of cell 1st M_2 ; abdomen black, the entire surface polished black or nacreous, without opaque bands; genital segment opaque orange.

Female.—Length, about 20 mm.; wing, 13 mm.

Rostrum and palpi black. Antennae (female) 11-segmented; scape black, pedicel and flagellum brownish-black; first flagellar segment a little shorter than the succeeding two combined; fifth and succeeding flagellar segments shorter. Head dark gray, with long erect black setae; vertical tubercle conspicuous, simple.

Pronotum dark gray. Mesonotal praescutum with the ground-color dull gray, with four polished blue-black stripes that are narrowly bordered by velvety black; setae of praescutal interspaces relatively short; scutal lobes polished blue-black; scutellum and postnotum black, sparsely pruinose, with conspicuous black setae. Pleura dull black, sparsely pruinose. Halteres short, black throughout. Legs black. Wings (fig. 9) strongly tinged with reddish-brown, cell Sc , especially in prearcular field, light yellow; cell Cu slightly infumed, especially on basal portion; veins brownish-yellow to yellow. Costal setae abundant; macrotrichia on outer radial veins, on outer medial veins sparse and restricted to outer sections of veins M_1 and M_2 . Venation: R_s long, exceeding twice the length of R , on one wing (as figured) slightly longer than on the other; R_{1+2} subequal to R_{2+3+4} ; $r-m$ variable, from oblique (as figured) to shorter and transverse; cell M_1 present; $m-cu$ at or beyond midlength of lower face of cell 1st M_2 .

Abdomen relatively long, black, the entire surface polished, without opaque bands. Genital shield opaque orange.

Hab. French Indo-China (WNW. Tonkin).

Holotype, ♀ Laokay, August 12-13, 1934 (E. R. Tinkham).

By Edwards's key to the Old World species of *Eriocera* (l.c.), the present fly runs to couplet 35, where it disagrees with both alternatives in the uniformly polished or nacreous abdomen. Otherwise the species runs to *Hexatoma* (*Eriocera*) *lygropis* (Alexander), of Formosa, an entirely different fly.

16. *Hexatoma* (*Eriocera*) *rufipennis* (Alexander)

1925. *Eriocera rufipennis* Alexander, Encycl. Ent., Diptera, 2: 87-88.

The type, a unique male, was from Canton.

Allotype, ♀, White Cloud Mountain, Canton, P'an-yu District, June 11, 1933 (E. R. Tinkham).

Female.—Length, about 24 mm.; wing, 16 mm.

Characters as in male, differing as follows: Antennae (female) 12-segmented, brown. Vertical tubercle conspicuous, entire. Praescutal stripes and scutal lobes shining black rather than blue-black;

setae of interspaces moderately long. Venation: R_{2+3+4} somewhat shorter than in the type but the proportions existing between R_{2+3+4} and the basal section of R_s about the same; M_{1+2} in alignment with M_2 , M_1 arched at origin; cell 1st M_s shorter than in the type. Abdomen elongate, black, the caudal margins of the segments more opaque black than the more polished blue-black basal rings; genital shield orange; cerci elongate.

17. *Hexatoma (Eriocera) kelloggi* Alexander

1932. *Hexatoma (Eriocera) kelloggi* Alexander, Phil. Jour. Sci. 49: 123-124.

The type was from Foochow, Fukien Province. Additional specimens representing both sexes. KWANGTUNG: Lung Ping Hui, Lien District, May 15, 1934 (F. K. To). Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei District, July 19-29, 1933 (F. K. To). Yam Na Shan, about 50 li SE-E. of Ping Chuen, Mei District, September 1-5, 1933 (F. K. To). Canton, White Cloud Mountain, P'an-yu District, May 29, 1934, June 11, 1933 (E. R. Tinkham).

FUKIEN: Kuliang Mountain, Foochow, Min-how District, July 6-29, 1932 (S. B. Tang).

These specimens are somewhat larger than the type (*Male*.—Length, 19-20 mm.; wing, 17-17.5 mm. *Female*.—Length, about 22 mm.; wing, 18 mm.). Genital shield (female) orange.

The relation of *kelloggi* to the earlier described *Hexatoma (Eriocera) muiri* Alexander (Proc. Hawaiian Ent. Soc. 5: 255, 1923), from Macao, is still uncertain. While generally similar in many respects, the yellow crossband on the wing of *muiri* is much more distinct and well-delimited by the strongly darkened basal half of the wing. Both species have the legs and abdomen uniformly blackened, thus differentiating them from the other large regional species of the *mesopyrrha* group, as *praelata* Alexander, *pyrrhopygia* Alexander and *posticata* Alexander.

18. *Hexatoma (Eriocera) scalarator* n. sp. (fig. 10)

General coloration velvety black; center of vertex reddish; scutellum orange; abdomen conspicuously dilated, tergites two to six, inclusive, with broad transverse orange bands; antennae, halteres and legs black throughout; wings broad, blackish; cell M_1 lacking, $m-cu$ at fork of M .

Female.—Length, about 22 mm.; wing, 18 mm.; antennae, about 4.4 mm.

Rostrum and palpi black. Antennae (female) 11-segmented, black throughout; first flagellar segment a little shorter than the succeeding two combined; outer segments gradually decreasing in length and diameter; terminal two segments subequal. Head black, the central region of the posterior vertex extensively dull reddish;

vertical tubercle trilobed, the median lobe lying a little more cephalad than the laterals.

Pronotum black. Mesonotal praescutum and scutal lobes deep velvety black; vestiture short and very sparse; median region of scutum posteriorly and the scutellum dull orange, parascutella black; postnotum black. Pleura uniform deep velvety black. Halteres short, black. Legs black throughout. Wings (fig. 10) broad on basal two-thirds, the outer end more narrowed; costal cell dilated; wings strongly suffused with blackish; veins darker. Costal setae abundant; macrotrichia on all outer veins of radial field, on distal section of vein M_{1+2} and on outer half of vein M_r . Venation: R_s angulated at origin, about one-half longer than R ; R_{2+3+4} shorter than basal section of R_s ; R_{1+2} about one-half longer than R_{2+3+4} ; cell M_1 lacking; $m-cu$ at fork of M , nearly twice as long as the distal of Cu_1 .

Abdomen conspicuously widened, viewed from above noticeably wider than the thorax; tergites black, segments two to six with broad, conspicuous, orange bands, the caudal margins remaining narrowly black; sternites uniformly black; surface of abdomen opaque, without shining or nacreous rings; genital shield of ovipositor velvety black; cerci long and slender, horn-colored, upcurved.

Hab. China (Kwangtung).

Holotype, ♀, White Cloud Mountain, Canton, P'an-yu District, May 6, 1934 (E. R. Tinkham).

The nearest ally is *Hexatoma (Eriocera) platysoma* Alexander (China: Szechwan), which has the abdomen similarly dilated, at least in the male sex, differing conspicuously in the pattern of the abdomen, where tergites one to four, inclusive, are orange. *H. (E.) abdominalis* Alexander (China: Kiangsi) is more distantly allied.

19. *Hexatoma (Eriocera) chrysomela* (Edwards)

1931. *Eriocera chrysomela* Edwards, Ann. & Mag. Nat. Hist. (9)8:88-89.

This exceptionally beautiful *Eriocera* was described from Hong Kong (Bowring, 1861).

KWANGTUNG: White Cloud Mountain, Canton, P'an-yu District, May 27, 1934 (E. R. Tinkham). Loh Fau Shan, Wa Shau T'oi, altitude 800 feet, June 30, 1934 (E. R. Tinkham).

20. *Hexatoma (Eriocera) tinkhami* n. sp. (fig. 11)

General coloration dull velvety black, the praescutum with three glabrous nacreous stripes, the centers of the scutal lobes similarly colored; antennae, halteres and legs uniformly black; wings brownish-black, the anal cells paler; a conspicuous transverse discal white area before cord, extending from vein R nearly to wing-margin in cell Cu ; veins beyond cord with numerous trichia; R_2 slightly oblique; R_{2+3+4} short, R_{1+2} long; outer radial cells deep;

abdominal tergites velvety black, segments two to seven, inclusive, with narrow nacreous glabrous rings; genital shield of ovipositor orange.

Female.—Length, about 16-17 mm.; wing, 13-13.5 mm.

Rostrum and palpi black. Antennae (female) black throughout, 10-segmented; segments gradually shortening; setae of moderate length. Head dull grayish-black, with long coarse black setae.

Pronotum dull black, more reddish behind. Mesonotal praescutum with the ground-color dull velvety black, with three glabrous nacreous stripes; setae of interspaces abundant, erect, black; posterior sclerites of mesonotum dull velvety black, the centers of the scutal lobes polished nacreous. Pleura, including the dorsopleural membrane, dull black. Halteres black. Legs black throughout; coxae and trochanters with long black setae. Wings (fig. 11) with the ground-color brownish-black, the Anal cells paler, gray, broadly more brownish along vein *2nd A*; a conspicuous transverse white discal area lying before cord, extending from vein *R* almost to wing-margin in cell *Cu*, slightly narrowed at either end; a small yellowish spot in cell *Sc₁* distad of *Sc₂*; veins brownish-black, more yellowish in the white discal area. Numerous trichia on all longitudinal veins beyond cord. Venation: *Sc₁* ending opposite the slightly oblique *R₂*; *Rs* about one-half longer than *R*; *R₁₊₂₊₃* short, less than one-half the basal section of *R₅*; *R₁₊₂* long, about one-half *Rs*; outer radial cells deep; *R₂* at margin fully twice as wide as *R₃*; *m-cu* at three-fourths to four-fifths the length of the lower face of cell *1st M₂*.

Abdominal tergites velvety black, with relatively narrow, nacreous, glabrous rings on segments two to seven, inclusive; sternites dull black; eighth segment and genital shield orange. Ovipositor with valves long and slender, especially the cerci.

Hab. China (Kwangtung).

Holotype, ♀, Loh Fau Shan, Grand Gorge, altitude about 3000 feet, August 8, 1933 (E. R. Tinkham). *Paratotype*, ♀, Big Pool, altitude about 2600 feet, August 7, 1933 (E. R. Tinkham).

I am very pleased to be able to dedicate this fine species to the collector, Mr. Ernest R. Tinkham, who has added greatly to our knowledge of the distribution of the Tipulidae in southeastern China. The fly is conspicuously different from the now numerous species that center about *Hexatoma (Eriocera) hilpa* (Walker). The nature of the glabrous praescutal stripes, wing-pattern and venation distinguish the species from all other regional members of the subgenus.

21. *Hexatoma (Eriocera) hoffmanni* n. sp. (fig. 12)

Allied to *hilpa*; general coloration black, the praescutum virtually covered by polished black stripes; antennae (male) relatively long, with unusually long coarse verticils; halteres and legs

black throughout; wings dark brown, Anal cells more grayish; an oblique yellow band virtually crosses the wing from the end of vein Sc_1 into the outer end of cell Cu ; more obscure yellow areas that are freckled with brown lie before and beyond origin of R_s and at basal third of cell M ; R_{2+3+4} and basal section of R_s subequal, shorter R_{1+2} ; $m-cu$ at near midlength of cell 1st M_2 ; abdomen with segments broadly nacreous at base, the outer third of the segments velvety black; genital shield of female orange.

Male.—Length, about 9-10 mm.; wing, 11-12 mm.; antenna, about 5 mm.

Female.—Length, about 16 mm.; wing, 13 mm.

Rostrum and palpi black. Antennae relatively long, especially in male, as shown by the measurements; 7-segmented in male, 11-segmented in female; flagellar segments with unusually long coarse verticils, especially in male; on the fifth and sixth segments these verticils are from one-third to one-fourth the length of the segments; besides the long verticils, the entire segments are covered with a short erect white pubescence. Head dull black; vertical tubercle low to scarcely evident.

Mesonotum opaque black, the praescutum virtually covered by three polished black stripes that are narrowly bordered by opaque black, the narrow posterior interspaces polished but with long erect setae; centers of scutal lobes polished; posterior sclerites of notum more opaque; scutellum with abundant long erect setae. Pleura dull black. Halteres black. Legs black throughout. Wings (fig. 12) dark brown, the Anal cells more grayish; an oblique yellow band virtually crosses the wing, beginning at costa near end of vein Sc_1 , terminating in outer end of cell Cu , narrowest where it traverses R_s ; less distinct yellow areas that are speckled with brown lie before and beyond origin of R_s and at basal third of cell M ; veins dark, more yellowish in the discal band. Outer radial veins with trichia; a few on outer end of vein M_{1+2} , lacking on other veins beyond cord. Venation: Sc_1 relatively short, ending opposite fork of R_{2+3+4} ; R_s relatively short, about one-third longer than R ; R_{2+3+4} and basal section of R_s subequal, a little less than R_{1+2} ; cell M_1 lacking; $m-cu$ at near midlength of cell 1st M_2 .

Abdominal segments with bases broadly glabrous and nacreous, the caudal borders more narrowly opaque black; genital shield in female orange; hypopygium black.

Hab. China (Kwangtung).

Holotype, ♀, Shek Mun Kap, Lan-tau Island, near Hong Kong, August 15, 1934 (Y. W. Djou). *Allotype*, broken ♂, Hong Kong Island, summer of 1933 (W. E. Hoffmann). *Paratype*, a broken ♂, Lin Wa Toi, Lan-tau Island, August 10, 1934 (Y. W. Djou).

This interesting species is named in honor of Professor William E. Hoffmann, in grateful recognition of his continued co-operation

in making known the rich Tipulid fauna of southern and eastern China. The fly is quite distinct from those members of the subgenus that are allied to *hilpa* and have the praescutal stripes polished. The unusually long antennal verticils and the narrow oblique yellow discal fascia distinguish the species from all such allied forms.

22. *Hexatoma (Eriocera) davidi* (Alexander)

1922. *Eriocera davidi* Alexander, Bull. Mus. d'Hist. Nat. Paris, for 1922 : 295-296.

One female, Loh Fau Shan, Kwangtung, altitude 3800-4000 feet, August 12, 1933 (E. R. Tinkham). The mesonotum is uniformly opaque velvety black, with delicate but conspicuous erect setae on praescutal interspaces, scutum and scutellum. Genital shield of female fiery orange.

23. *Hexatoma (Eriocera) tuberculata* Alexander

1936. *Hexatoma (Eriocera) tuberculata* Alexander, Phil. Jour. Sci. 61 : 130-131.

The types of this distinct fly were from various stations in Hainan, collected by Mr. J. Linsley Gressitt. Several additional specimens from different Hainan localities.

Tai-ping-lam-ts'uen, back of Lai-mo-ling (mountain range), Ting-an District, June 11-12, 1935 (F. K. To). Tai-tsing-lam-ts'uen, back of Lai-mo-ling, Ting-an District, June 13-16, 1935 (F. K. To). Cheung-kon-ts'uen, Ka-luk-kon, 18 miles east of Naam-fung, Kiung-shan District, March 29-31, 1935 (F. K. To). Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling, Kiung-shan District, May 17-18, July 22, 1935 (F. K. To). Faan-da, 9 miles south of Nodoa, Tan District, July 10-11, 1932 (F. K. To). Hau-ying-ts'uen, 5 miles SE. of Nodoa, Lin-kao District, August 1-6, 1932 (F. K. To).

24. *Hexatoma (Eriocera) cantonensis* Alexander

1938. *Hexatoma (Eriocera) cantonensis* Alexander, Phil. Jour. Sci. (in press).

Described from specimens taken at various stations in Kwangtung and Kiangsi Provinces. Additional Kwangtung records: Loh Fau Shan, Big Pool, altitude about 2600 feet, August 7, 1933 (E. R. Tinkham). Tung Chung, Lan-tau Island, near Hong Kong, August 16-19, 1934 (Y. W. Djou). Shek-mun-kap, Lan-tau Island, August 15, 1934 (Y. W. Djou).

25. *Hexatoma (Eriocera) monoleuca* n. sp. (fig. 13)

General coloration dark reddish-brown; head and thorax with long coarse erect setae; antennal flagellum uniformly brown; halteres and legs brown; wings brown, with a small whitish hyaline discal area in outer ends of cells R and M ; R_2 transverse; R_s in direct alignment with R_s ; $m-cu$ at outer end of cell 1st M_2 ; genital shield of ovipositor orange.

Female.—Length, about 13 mm.; wing, 10 mm.

Rostrum and palpi reddish-brown. Antennae brown, the flagellar segments not bicolored, as in *hirtithorax*. Head brown; vertical tubercle entire; head with unusually long and abundant dark setae.

Mesonotum dark reddish-brown, the praescutum with an intermediate pair of lighter reddish stripes, the usual lateral stripes less distinct; setae of praescutal interspaces abundant, long and erect; scutellum with conspicuous setae; nediotorite nearly glabrous. Pleura reddish-brown. Halteres dark brown. Legs reddish-brown, the outer tarsal segments darker. Wings (fig. 13) relatively short and broad, light brown, the Anal cells a trifle paler; a small whitish hyaline discal area occupying the outer ends of cells R and M , barely invading cell R_1 , its outer edge at fork of Rs ; veins brown, M more yellowish in the discal area. Venation: Sc_1 ending opposite the faintly indicated, transverse R_2 ; h oblique; Rs relatively short, in direct longitudinal alignment with R_5 ; R_{2+3+4} short, only a little more than one-half the basal section of R_5 ; outer Medial veins faint; $m-cu$ at extreme outer end of cell 1st M_2 , subequal to the distal section of Cu_1 ; cell 2nd A narrower than in *hirtithorax*.

Abdomen reddish-brown, the intermediate tergites darker, especially medially; basal rings not conspicuously nacreous but glabrous or virtually so; genital shield orange.

Hab. China (Hainan Island).

Holotype, ♀, Hau-ying-ts'uen, 6 miles SE. of Nodow, Lin-kao District, July 27-28, 1932 (F. K. To).

The nearest relative is *Hexatoma (Eriocera) hirtithorax* Alexander, likewise from Hainan Island, which differs in the intense velvety black coloration, distinct wing-pattern and venation, and the intensely blackened genital shield of the ovipositor. It is possible that the present fly may be discolored and that in living specimens the color of the body and appendages may be darker than above described.

26. *Hexatoma (Eriocera) bifrenestrata* n. sp. (fig. 14)

General coloration black, the mesonotal praescutum opaque gray, with four narrow, dull blackish stripes; antennae (male 8-segmented); halteres and legs black; wings brown, the Anal cells paler; two large whitish discal areas forming an irregular band before cord, separated from one another by dark color along Rs ; a tiny yellow spot at wing-tip; R_{2+3+4} longer than R_{1+2} or basal section of R_5 ; cell R_5 at margin subequal in extent to cell R_2 ; cell 1st M_2 longer than any of the veins beyond it; abdomen with bases of segments broadly bluish nacreous, the apices narrowly velvety black.

Male.—Length, about 14 mm.; wing, 11 mm.; antenna, about 3 mm.

Rostrum and palpi black. Antennae (male) 8-segmented; scape and pedicel brownish-black, flagellum paler brown; flagellar segments gradually decreasing in length and diameter outwardly. Head dull black, sparsely pruinose; vertical tubercle small, simple, with smaller raised areas in front of it.

Pronotum blackish-gray. Mesonotal praescutum opaque gray, with four narrow, more blackish, opaque stripes; intermediate pair narrowly separated by a gray line, ending some distance before suture; setae of interspaces long and conspicuous; posterior sclerites of notum blackened. Pleura black. Halteres black, the stem paler. Legs black. Wings (fig. 14) strongly suffused with brown, the anal cells paler, except for a broad seam along vein *2nd A*; two whitish discal areas, a small one in cell *R*, and a larger area in outer ends of cells *R* and *M*, extending from *Rs* across the outer end of vein *M* to beyond midwidth of cell *M*; a tiny yellow apical spot in extreme ends of cells *R₁* and *R₄*; veins brown, yellow in the major discal area. Macrotrichia on outer branches of *R*, more sparse on the posterior veins, lacking on *M* and *Cu*. Venation: *Rs* relatively short, about one-fifth longer than *R₁*, a little arched before mid-length; *R₂₊₃₊₄* about twice the basal section of *R₅*; *R₁₊₂* about two-thirds *R₂₊₃₊₄*; *R₂* subequal to *R₃₊₄*, transverse; veins *R₁* and *R₄* diverging widely at outer ends so cell *R₁* at margin is subequal to or a little wider than cell *R₂*; cell *1st M₂* elongate, exceeding the veins beyond it; *m-cu* at about two-thirds the length of the cell, a little longer than the distal section of *Cu₁*.

Abdomen relatively long, the bases of the segments broadly nacreous, with bluish reflexions, the caudal borders more narrowly velvety black, this becoming a little wider on the outer segments; outermost segments and hypopygium uniformly black.

Hab. China (Hainan Island).

Holotype, ♀, Hau-ying-ts'uen, 5 miles SE. of Nodoa, Lin-kao District, August 1-3, 1932 (F. K. To).

A very distinct species. By Edwards's key to the species of *Eriocera* (l.c.), it runs to couplet 105, including *Hexatoma* (*Eriocera*) *selene* (Osten Sacken) and *H. (E.) leucotela* (Walker), entirely different flies.

27. *Conosia irrorata* (Wiedemann)

1828. *Luminaria irrorata* Wiedemann, Aussereur. zweifl. Ins 1:574.

Very widely distributed over the Palaeotropical Regions.

KWANGTUNG: Loh Fau Shan, Grand Gorge, altitude about 3000 feet, August 8, 1933 (E. R. Tinkham). Honam Island, Canton, P'an-yu District, May 21, 1935 (W. E. Hoffmann), November 21, 1933 (E. R. Tinkham), September 28, 1936 (F. K. To). Wui-tung,

Lingnan Agricultural Experiment Station, Chung-shan District,
March 9-12, 1935 (H. Fung). Yaoshan, mountain range, Lien District,
April 24-26, 1934 (F. K. To).

中國大蚊科之研究（雙翅目）

II. 中國東南部之新大蚊及其鮮經研究之品種

亞力山大著

美國士得色朱沙麻大學

（摘要）

本文首節見民國十一年之嶺南科學季刊第十一卷第五〇五至五〇八頁。此節發表華產大蚊共二十七種。計屬 *Tipulinae* 亞科者九種，中以 *Ctenophora pselliophoroides*, *Pselliophora sternoloba*, *P. fuscolimbata*, *P. jubilata*, 及 *Tipula (Oreomyza) clinata*. 為新種。屬 *Cylindrotominae* 亞科者僅一種；惟屬 *Limoniinae* 亞科者則有十七種，中以 *Limonia (Libnotes) lantauensis*, *Hexatomia (Eriocera) toi*, *H. (E.) longiradialis*, *H. (E.) scalarator*, *H. (E.) tinkhami*, *H. (E.) hoffmanni*, *H. (E.) monoleuca*, 及 *H. (E.) bifenestrata*. 為新種。

**STUDIES ON CHINESE HYDROZOA. II. REPORT ON SOME
COMMON HYDROIDS FROM THE EAST SADDLE ISLAND**

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SERTULARIDAE

Sertularella Gray

Trophosome.—Colony generally branched, stem and branches divided regularly into more or less similar internodes. Hydrothecae strictly alternate, one or two to each internode, margin toothed, with a three- to four-flapped operculum.

Gonosome.—*Gonangia* quite similar to those of *Sertularia*, but usually with deep annulations; aperture may be encircled by a collar, margin with prominent spine-like teeth.

Sertularella indivisa var. **bidentata** n. var. (fig. 15, 16)

Trophosome.—Stem rising from a creeping stolon, growing usually on algae; unbranched, reaching a height of about 20 mm.; with 2-4 slightly inclined rings at base close to hydrorhiza. Hydrothecae alternately arranged, nearly always on the same plane, one to each internode; basal 3/7 sessile, the rest free; sides swollen slightly at middle, without distinct neck; orifice wide, margin with four small teeth, operculum four-flapped. Periderm of stem and theca rather thick. Internodes clearly separated by distinct constrictions.



Fig. 15. *Sertularella indivisa* var. *bidentata* n. var., colony.

Length of internode .....	.55-.60 mm.
Length of hydrotheca .....	.45-.47 mm.
Width at middle of hydrotheca .....	.23-.25 mm.
Width at orifice of hydrotheca .....	.19-.20 mm.

Gonoome.—Gonothecae rising rising from basal part of stem, very seldom from hydrorhiza, usually one to each internode, borne on very short and unannulated stalks; elongate ovate, with 4-6 heavy

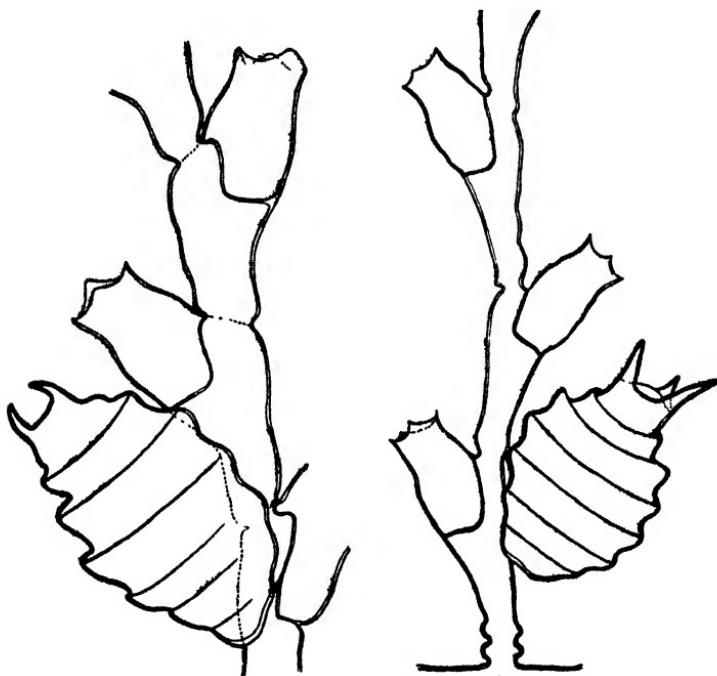


Fig. 16. *Sertularia indivisa* var.
bidentata n. var., basal portion of
colony, enlarged.

Fig. 17. *Sertularia minrensis* var.
pingens Stechow, colony.

annulations; apex narrow, necklike; margin with two strong thorns, moderate in length and subequal in size.

Length of gonotheca .....	.90-1.00 mm.
Width at middle of gonotheca .....	.48-.50 mm.
Width of orifice of gonotheca .....	.09-.10 mm.
Length of thorn .....	.05-.06 mm.

Locality and Date.—Numerous specimens were collected from the East Saddle Island (螺山, 螺子岛), on July 1, 1936.

Remarks.—This new variety differs from its type species *Sertularia indivisa* by having always only two thorns at the apex of the gonotheca.

***Sertularella miurensis* var. *pungens* Stechow (fig. 17)**

Sertularella miurensis var. *pungens* Stechow & Uchida, 1931, Sci. Rept., Imp. Univ., Tohoku, 4 ser. 6(3) : 556-558, fig. 7.

Trophosome.—Colony rising from a creeping stolon; stem slender, slightly geniculate, seldom branched, reaching a height of about 25 mm.; internodes rather long, regularly marked by distinct constrictions, each bears a hydrotheca. Branches when present are few in number, irregularly arranged and resembling the main stem in every respect. Hydrotheca rather large, subcylindrical, stout, about twice as broad as long; basal 2/5 immersed, distal 3/5 free, middle portion slightly swollen; aperture wide, margin with four teeth of moderate size; operculum with four flaps.

Length of stem	15-25 mm.
Length of immersed portion of theca	0.18-0.2 mm.
Length of free portion of theca	0.23-0.25 mm.
Width of theca at middle	0.22-0.24 mm.
Width of orifice of theca	0.19-0.2 mm.

Gonosome.—Gonothecae nearly always rising from the basal portion of stem, borne on short unringed stalk, at the side of stem, very close to hydrotheca. Two types of gonothecae may be recognized. The larger ones are the females, robust, ovate, with 4-7 deep annulations, neck distinct, aperture small, margin provided with three long stout thorns subequal in size. The smaller ones are the males, ovate, with 4-7 deep spiral annulations, aperture wide, distal end truncate, without conspicuous thorns or teeth.

Length of female gonotheca (excluding thorn)	0.7-0.8 mm.
Length of thorn of gonotheca	0.15-0.18 mm.
Length of male gonotheca	0.6-0.66 mm.

Locality and Date.—Specimens of this species were collected from the East Saddle Island (東山, 黃隨嘴), July 15, 1936.

Symplectoscyphus***Symplectoscyphus hosawai* Stechow (fig. 18)**

Symplectoscyphus hosawai Stechow & Uchida, 1931, Sci. Rept., Imp. Univ., Tohoku, 4 ser. 6(3) : 551-553, fig. 4.

Trophosome.—Stem rising from a creeping stolon, including hydrorhiza about 20-24 mm. in height; seldom branched, when side

branches present they are few in number and are confined mostly to the basal region of stem; internodes more or less similar in length in the same branch but vary slightly in different stems. Hydrothecae all on the same plane, alternately arranged, one to each internode. First hydrotheca rising from the stem very close to the junction between the stem and hydrorhiza where one or two rings are usually present. The distance between two successive hydrothecae is about the length of a hydrotheca. Hydrothecae plain, without rings, sides almost parallel, slightly swollen at middle and narrower at orifice, neck absent; immersed for almost half of its length in the stem, distal half free, bent smoothly away from the long axis of stem forming an angle of about 65° . Orifice of hydrothecae with three large thorns, two larger ones situated close together on the abcaulin side, while the third one is slightly smaller and is present opposite to the former two. Periderm of stem and hydrothecae rather thick, light yellowish-brown to deep brown in color.

Length of internode .....	.....	0.38-0.42 mm.
Length of hydrotheca .....	.....	0.45-0.55 mm.
Length of immersed part of hydrotheca .....	.....	0.20-0.24 mm.
Length of free portion of hydrotheca .....	.....	0.25-0.29 mm.
Width of hydrotheca—basal portion.....	.....	0.11-0.12 mm.
Width of hydrotheca—middle portion .....	.....	0.16-0.18 mm.
Width of hydrotheca—orifice .....	.....	0.10-0.12 mm.
Thickness of periderm .....	.....	0.01-0.012 mm

Gonosome.—Gonothecae not present in the specimens examined.

Locality and Date.—Several colonies of this species were collected from the East Saddle Island (螺山, 箱子岙), July 20, 1936.

Thuiaria Fleming

Trophosome.—Colony branched, rising from creeping hydrorhiza; stem and branches erect, divided into internodes each of which bears more than two pairs of hydrothecae. Hydrothecae subopposite or alternate, usually deeply immersed in hydrocauli, orifice may be smooth or toothed; operculum one- or two-flapped.

Gonosome.—Gonangia very much similar to those of *Sertularia*; oval, with large aperture, smooth or with one to two spines on the shoulders.



Fig. 18. *Symplectes myriophyllum hucurai* Stechow,
portion of colony

Thuiaria tubuliformis (Marktanner-Turneretscher) (fig. 19, 20)

Thuiaria tubuliformis Nutting, 1904, Spec. Bull. U. S. Nat. Mus., pt. 2, p. 70; Hargitt, 1924, Phil. Jour. Sci. 24:493; Hargitt, 1927, Bull. Mus. Comp. Zool. 67(16): 508-509, pl. 2, fig. 4-5.

Trophosome.—Colonies rising from complex creeping stolens, reaching about 30 mm. in height, usually irregularly branched. Side branches mostly alternate, very seldom opposite. Main stem more or less geniculate. Usually two pairs of hydrothecae present to each internode, more than two pairs may sometimes occur. Only one pair of hydrothecae occur at each internode near base of stem. Length of

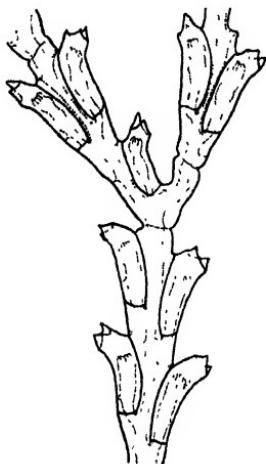


Fig. 19. *Thuiaria tubuliformis* (Marktanner-Turneretscher), portion of colony.

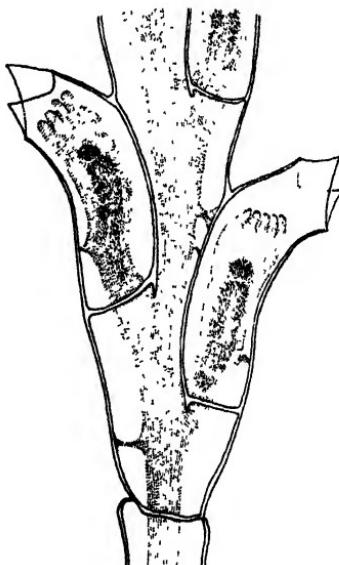


Fig. 20. *Thuiaria tubuliformis* (Marktanner-Turneretscher), a pair of hydranths, enlarged.

internode varies greatly. The marked feature of the relation of hydrothecae to branches and stem as described by Hargitt (1927) has been clearly observed: "The branch at the base of an internode which bears it will have an even number of paired hydrothecae, the internode having an odd hydrothecae in the axis of stem and branch always attached to the stem." Hydrothecae subopposite, long, tubular, sessile for almost 3/4 of its length, the distal fourth is free and turns abruptly away from the stem almost at right angle; orifice with two large pointed teeth; operculum with two big flaps.

Length of hydrotheca 0.6-0.7 mm.

Width of hydrotheca 0.18-0.2 mm.

Gonosome.—Gonangia not present in the specimens examined.

Locality and Date.—Specimens studied were collected from the East Saddle Island (嵊山, 黃陸嘴), July 1936.

PLUMULARIDAE
Plumularia Lamarck

Trophosome.—Colony simple or branched; hydrocladia without side branches, pinnately arranged, either opposite or alternate. Hydrothecae cup-like, margin smooth; all nematophores movable.

Gonosome.—Gonothecae borne on hydrocaulus or hydrocladia, simple without protective corbulæ.

Plumularia setaceoides Bale (fig. 21, 22)

Plumularia setaceoides Bale, 1884, Cat. of the Austral. Hydroid Zoophytes, p. 136; Hargitt, 1927, Bull. Mus. Comp. Zool. 67(16) :513.

Trophosome.—Colonies rising from creeping root-like hydrorhiza reaching a height of 30-50 mm.; simple, with few branches sometimes. Branches usually alternately arranged, rising from the stem between the internodal fold and its hydrocladum. Both stem and branches divided into more or less regular internodes by oblique sutures; each internode bears at its distal end a hydrocladum on a spur-like structure. Hydrocladia arranged alternately in pinnate form. Each hydrocladum may bear one to four hydrothecae. Hydrothecae cup-like, slightly higher than broad, base broad and sessile; posterior margin almost straight, anterior margin concave at middle; margin wide, smooth and slightly everted. Supracalyceine nematophores with their insertion on a level with the anterior margin of the base of hydrotheca. One mesial nematophore present below the hydrotheca, another in front of the intermediate internode. Two caudine nematophores present on the spur bearing the hydrocladum. Nematophores on caudine internodes are single, alternate, and only occasionally paired.

Length of caudine internode .....	.....	0.3-0.35 mm.
Length of hydrothecæ .....	.....	0.17-0.2 mm.
Width of margin of hydrotheca .....	.....	0.13-0.15 mm.



Fig. 21. *Plumularia setaceoides* Bale, portion of colony.



Fig. 22. *Plumularia setaceoides* Bale, hydranth.

Gonosome.—Gonothecae small, with slightly truncate apex, almost rounded and borne on short stalk rising at the junction between base of hydrocladum and caudine.

Length of gonotheca 0.12-0.12 mm.

Width of gonotheca 0.10-0.11 mm.

Locality and Date.—Specimens studied were collected from the East Saddle Island (東山, 黃龍嘴), July 1936.

Lytocarpus Kirchenpauer

Trophosome.—Stem fascicled; hydrothecae with toothed or sinuous margin; mesial nematophores usually with two openings, a perforated opening near the base of the free portion, and a terminal one at tip.

Gonosome.—Gonangia borne on hydrocladia which are modified to form protective branchlets, often resembling a carbula. (Hargitt)

Lytocarpus nuttingi Hargitt (fig. 23, 24)

Lytocarpus nuttingi Hargitt, 1927, Bull. Mus. Comp. Zool. 67(16) : 515, fig. 5, pl. 2, fig. 2.

Trophosome.—Stem erect, rising from a reticulated hydrorhiza, fascicled in mature specimens, reaching a height of 60 mm.,

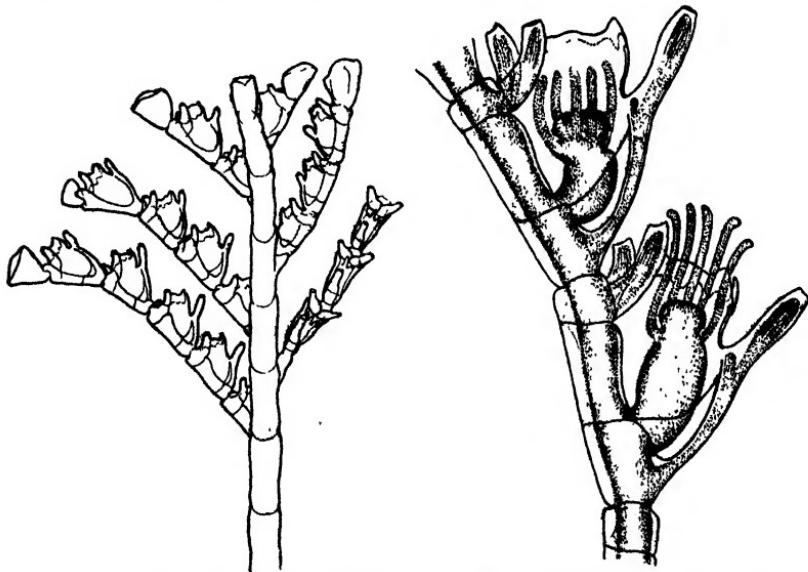


Fig. 23. *Lytocarpus nuttingi* Hargitt, portion of colony.

Fig. 24. *Lytocarpus nuttingi* Hargitt, hydranths, enlarged.

irregularly and sparingly branched. Branches usually alternate, each bearing closely set hydrocladial pinnae forming a graceful,

delicate, feather-like colony. Hydrocladia borne on both main stem and branches. Hydrothecae present on front surface of hydrocladia, one to each internode, entirely sessile, margin wide and sinuous, with one conspicuous, slender, and bluntly pointed median tooth in front and two low, blunt teeth on each side. Lateral nematophores two in number, large and long, spread outward on both sides. Mesial nematophore long, adnate to the wall of hydrotheca for slightly more than half its length, the rest free and slender, extending upward obliquely slightly above the margin of hydrotheca with an opening on the upper surface close to the hydrotheca and one at the terminal point.

Length of hydrotheca ...	..... . . . . .	0.27-0.30 mm.
Length of internode .....	..... . . . . .	0.30-0.34 mm.
Opening of hydrotheca .....	..... . . . . .	0.14-0.15 mm
Length of mesial nematophore .....	..... . . . . .	0.35-0.40 mm.

Gonosome.—Gonangia not present in the specimens studied.

Locality and Date.—Specimens studied were collected from the East Saddle Island (懸山, 黃陸嘴), July 1936.

Literature Cited

ALLMAN, G. J.

- 1877. Report on the Hydroids collected during the exploration of the Gulf Stream. *Mem. Mus. Comp. Zool.*, 5, 66 p., 34 pl.
- 1883. Report on the Hydroids dredged by H.M.S. "Challenger" during the years 1873-76. *Rept. Sci. Results Zool.* Part 1, Plumulariidae, 56 p., 20 pl., London.
- 1888. Reports on the Hydroids dredged by H.M.S. "Challenger" during the years 1873-1876. *Rept. Sci. Results Zool.* 23:1-90, 39 pl., London.

BALE, W. M.

- 1884. Catalogue of the Australian Hydroid Zoophytes, 198 p., 19 pl., Sydney.

BIGELOW, H. B.

- 1913. Medusae and Siphonophorae collected by the U.S. Fisheries steamer "Albatross" in the northwestern Pacific, *Proc. U.S. Nat. Mus.*, Part 44, p. 1-119, pl. 1-6.

BILLARD, A.

- 1913. Les Hydroïdes de l'Expedition du Siboga, I. Plumulariidae, Siboga Expedite VIIa :1-114, pls. 1-6.
- 1925. Les Hydroïdes de l'Expedition du Siboga, II. Syntheciidae. Sertulariidae. ibid. VIIb :115-232, pls. 7-9.

HARGITT, C. W.

- 1906. The organization and early development of the egg of *Clava leptostyla* Ag. *Biol. Bull.*, Part 10, p. 205-232, pl. 9.

1908. Notes on a few Coelenterates of Woods Hole. *Biol. Bull.*, Part 14, p. 95-120.
1927. Some Hydrozoa of South China. *Bull. Mus. Comp. Zool.*, 67(16) : 491-520, figs. 1-5, pl. 1-2.
1924. Hydrozoa of the Philippine Islands. *Phil. Jour. Sci.*, Part 24, p. 467-507, pls. 1-6.

HINCKS, THOMAS

1868. A History of the British Hydrozoa. 2 vols., Vol. 1, lxviii+338 p., 45 wood cuts. Vol. 2, 67 pl., London.

INABA, M.

1890. Hydrozoa obtained in Misaki, Miura, Soshu. *Zool. Mag.*, Tokyo.

MAYER, A. G.

1910. Medusae of the World. 3 vols. Washington.

NUTTING, C. C.

- 1900-1915. American Hydrozoa. *Spec. Bull. U.S. Nat. Mus.* Part 1, Plumularidae, 1900, Part 2, Sertularidae, 1904, Part 3, Campanularidae, Bonneviellidae, 1915.
- 1901 The Hydrozoa of the Woods Hole Region. *Bull. U.S. Fish Comm. for 1899*, Part 19, p. 325-386, figs. 1-105.
1905. Hydrozoa of the Hawaiian Islands collected by the Steamer Albatross in 1902. *Bull. U.S. Fish Comm. for 1903*, Part 3.
1927. Report on the Hydrozoa collected by the U.S. Fisheries Steamer "Albatross" in the Philippine region, 1907-1910. *U.S. Nat. Mus. Bull.* 100, vol. 6, pt. 3, p. 195-242, pl. 40-47.

STECHOW, E.

1909. Hydrozoenpolypen der Japanischen Oskuste, 1. Teil, Athecata und Plumularidae. *Abh. Math.-Phys. Kl. K. Bayr. Akad. d. Wissenschaften* 1. Suppl.-Bd., 6th Abh.:1111, fig. 18, pl. 1-7
1913. Neue Genera thecater Hydrozoen aus der Familie der Lafoeiden und neue Species von Théceten aus Japan. *Zool. Anzeiger* 43 :137-144.
1921. Über Hydrozoen der Deutschen Tiefsee-Expedition nebst Bemerkungen über einige andere Formen. *Zool. Anzeiger* 53 :223-236.
1923. Die Hydrozoenfauna der Japanischen Region. *Jew. Coll. Sci., Imp. Univ., Tokyo* 44 (art. 8) :1-23.
1929. Über Symbiosen von Hydrozoen mit Polychaeten. *Zool. Anzeiger* 86 :150-153.
1931. Neue Hydrozoen von Japan, Australien, Westindien und dem Mittelmeer. *Zool. Anzeiger*.

STECHOW, E., UND T. UCHIDA

1931. Report of the Biological Survey of Mutsu Bay. Part 1. Hydrozoen von Mutsu-Bai, Nord-Japan. *Sci. Rept., Imp. Univ., Tohoku*, 4th Ser., Biology, 6(3) :545-571, fig. 1-12, pl. 15.

TORREY H. B.

1902. The Hydrozoa of the Pacific Coast of North America. *Univ. of Calif. Publ., Zoology*, 1 :1-104, pl. 1-11.

中國水螅類之研究

II. 舟山羣島，嵊山之習見水螅蟲

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(摘要)

我國沿海各地，水螅類動物種數極多，但尙少為人所注意。廿五年夏，在舟山羣島之嵊山一帶，採得水螅蟲十五種，多數為我國之新記錄，其學名及產地如下：

GYMNOBLASTEA 裸子類

Fam. Eudendriidae 羽枝螅

Eudendrium pusillum var. *amoicum* Hargitt.....嵊山

Fam. Corynidae 棒螅

Coryne pusilla Gaertner.....嵊山

Fam. Tubularidae 筒螅

Tubularia mesembryanthemum Allen.....嵊山

CALYPTOBLASTEA 被子類

Fam. Campanularia 鐘螅

Campanularia flexuosa (Hinks).....嵊山, 青子坑*Campanularia* sp 嵊山, 酒州塘*Clytia minuta* (Nutting).....嵊山, 黃陸嘴*Orthopyris platycarpas* Bale.....嵊山, 黃陸嘴*Obelia gracilis* Calkins.....嵊山, 魚礁

Fam. Hebellidae 翼螅

Hebella sp. 嵊山, 黃陸嘴

Fam. Sertularidae 檜葉螅

Sertularella indivisa var. *bidentata* n. var. 嵊山, 箱子岙*Sertularella miurensis* var. *pungens* Stechow.....嵊山, 黃陸嘴*Symplectoscyphus hozawai* Stechow.....嵊山, 箱子岙*Thuiaria tubuliformis* (Marktanner-Turneretscher) 嵊山, 黃陸嘴

Fam. Plumularidae 羽狀螅

Plumularia setaceoides Bale.....嵊山, 黃陸嘴*Lytocarpus nuttingi* Hargitt.... 嵊山, 黃陸嘴

FURTHER NOTES ON SCIAENID FISHES OF CHINA

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(Continued from *Lingnan Science Journal* Vol. 17, No. 2, p. 173.)

Argyrosomus nibe (Jordan & Thompson)

Sciaena nibe Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:258, fig. 4 (type locality: Wakanoura).

Nibea nibe Jordan & Hubbs, 1925, Mem. Carnegie Mus. 10(2):243 (Osaka market; Nickawa Bay); Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):19 (Chusan); Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):52 (China Sea; Miya; Aitken; Hiroshima).

Nibea pingi Wang, 1935, Contr. Biol. Lab. Sci. Soc. China 10(9):448, fig. 32 (type locality: Chefoo, Shantung).

Pseudosciaena nibe Tang, 1937, Amoy Mar. Biol. Bull. 2(2):67 (Foochow).

D. X/1/30-32; A. II/7; V. 1/5. L.l. with 52-54 tubular scales; l.tr. 6-7/15; predorsal scales about 30. Depth in length 3.7-3.8; head 3.1-3.2. Eye in head 4.2 or 4.1; snout 3.7; postorbital space 2; interorbital 4; longest dorsal spine 2.8; second anal spine 5.8; length of peduncle 1.2; its depth 3.6. Depth of peduncle in its length 2.8 to 3.

Oblong, compressed. Head of moderate size. Jaws about equal in front, the lower jaw somewhat projecting when the mouth is open. Maxillary extending to posterior third or to the vertical from hind margin of orbit; 4 small pores at chin; no barbels; tip of snout with few pores, not distinct. Lips of moderate thickness; their edge with numerous small papillae-like projections. Villiform teeth on jaws, the outer upper series and the inner lower series enlarged, the anterior three pairs of enlarged teeth of upper jaws very strong and sharp. No canine. Some posterior inner teeth of lower jaw much enlarged, strong and widely set. Vomer and palate edentate. Eye large, high. Interorbital convex. Preopercular edge spinate, the spines of angle and lower limb somewhat stronger. Operculum terminating in two flat, blunt spines, the upper one longer. Branchiostegals 7. Gillrakers 6+12 to 14, the extreme one of the upper arch and 2 or 3 of lower arch rudimentary, longest slightly longer than gill-filaments, 2 in eye diameter. Pseudobranchiae present. Origin of dorsal above base of pectorals; a deep notch between spinous and soft portions. First dorsal spine minute, the third or fourth one longest; soft ray about as long as longest spine. Dorsal and anal devoid of scales, except one series of cycloid scales forming a sheath at their base. Pectorals 1.3 in head. Ventrals thoracic, about as long as pectorals. Anal short, inserted before middle of soft dorsal base, opposite to the 14th soft dorsal ray. First anal spine minute, second spine weak, not half as long as the first ray.

Caudal cuneate. Sensory tube of scales on lateral line branched posteriorly. Scales on head cycloid, those of body weakly ciliate. Scales below spinous dorsal with 17-24 basal radii; about 50 apical denticles; intestine short, with 9 pyloric caeca. Air-bladder one-chambered, with 27 pairs of lateral appendages. Peritoneum negro black; mouth cavity black. Vertebrae 24.

Drab-gray, dark above and silvery below. No distinct black opercular blotch. Spinous dorsal black terminally. Pectorals, anal, and caudal dark. Ventrals pale. No distinct spots or band on sides of body.

Largest specimen recorded at Chusan 443 mm., most common size at Chusan about 200-300 mm. to base of caudal. Size beyond 400 mm. in length rather rare. Fishing season extends from October to January round the Chusan Islands.

Argyrosomus argentatus (Houttuyn)

Sparus argentatus Houttuyn, 1782, Verh. Holland. Maatsch. Wet. Haarlem 20:319 (type locality: Japan) (Not *Sciaena argentata* Gmelin, 1879, which is a *Lutjanus*.)

Corvina argentata Valenciennes, 1830, Hist. Nat. Poiss. 5:144 (on Houttuyn).

Corvina siva Schlegel (not Cuvier & Valenciennes), 1843, Fauna Japonica, Pisces, p. 58, pl. 24, fig. 2 (Japan).

Coreuta argentata Jordan & Evermann, 1902, Proc. U. S. Nat. Mus. 25:351 (Formosa); Smith & Pope, 1906, Proc. U. S. Nat. Mus. 31:478 (Kochi).

Sciaena argentata Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:252 (copied); Izuku & Matsuura, 1920, Cat. Zool. Spec. Tokyo Mus. Vertebr., p. 147, (Kii); Tanaka, 1928, Figures and descriptions of the fishes of Japan 44:870, pl. 180, fig. 491 (Tokyo).

Sciaena bleekeri Day (not *Pseudotolithus bleekeri* Steindachner, 1866), 1876, The Fishes of India, Pt. 2, p. 185, pl. 45, fig. 4 (type locality: Bombay and Gwadur); 1889, Faun. Brit. India, Fishes 2:112 (India); Lloyd, 1907, Rec. Indian Mus. 1:225 (Akyal); Pearson, 1914, Ceylon Administr. Rept., p. E7; 1915-1918, ibid., p. F13.

Sciaena (Pseudosciaena) bleekeri Steindachner & Doederlein, 1884, Denk. Akad. Wiss. Wien, math-nat. Kl. 48 (pt. 1):33 (Japan).

Pseudosciaena schlegeli Bleeker, 1879, Verh. Akad. Amsterdam 18:9 (type locality: Nagasaki).

Sciaena (Pseudosciaena) schlegeli Steindachner & Doederlein, 1884, Denk. Akad. Wiss. Wien, math-nat. Kl. 48 (pt. 1):33 (Tokyo); Jordan & Thompson, 1911, Proc. U. S. Nat. Nat. Mus. 39:254 (Tokyo; Onomichi; Tsuruga; Nasetsu; Hiroshima; Kawatana; Nagasaki).

Sciaena (Pseudosciaena) schlegelii Steindachner, 1896, Ann. Hofmus. Wien 11:208 (Japan).

Sciaena schlegeli Snyder, 1912, Proc. U. S. Nat. Mus. 42:416 (Kagoshima); Jordan & Metz, 1913, Mem. Carnegie Mus. 6(1):37 (Fusan, Korea); Jordan & Thompson, 1914, Mem. Carnegie Mus. 6(4):258 (Matsushima Bay; Osaka); Sowerby, 1930, The Naturalist in Manchuria 4:188 (off Shantung, east and northern Chihli; south Manchuria; west Korea); Anonymous, 1931, Illustr. Jap. Aquat. Plant. Anim. 1:37, fig. 3 (Japan).

Sciaena (Argyrosomus) schlegeli Schmidt, 1931, Trans. Pacif. Comm. Acad. Sci. USSR 2:71 (Fusan).

Corvula schlegeli Jordan & Snyder, 1901, Annotat. Zool. Japonen. 3:81 (Yokohama; Nagasaki); 1901, Proc. U. S. Nat. Mus. 23:356 (Tokyo); Franz, 1910, Abh. bayer. Akad. Wiss., math.-phys. Kl. Vol. 4, suppl. 1:45, pl. 6, fig. 50. (Yokohama; Dzushu).

Nibea schlegeli Jordan & Hubbs, 1925, Mem. Carnegie Mus. 10 (2):243 (Shizuoka; Osaka; Tokyo; Kobe; Mikawa Bay; Misaki; Fukuoka; Fukiu; Miyazu); Schmidt & Lindberg, 1930, Bull. Acad. Sci. USSR p. 1140 (Tsuruga); Wang, 1935, Contr. Biol. Lab. Sci. Soc. China 10(9):445 (Chefoo, Shantung).

Corvina yeddoensis (Doederlein) Steindachner & Doederlein, 1884, Denk. Akad. Wiss. Wien, math-nat Kl. 48(1):35 (type locality. Jeddo) (Name in text.)

Sciaena (Nubea) yeddoensis Schmidt, 1931, Trans. Pacif. Comm. Acad. Sci. USSR 2:72 (Nagasaki).

Corvina sina Nyström (not Cuvier), 1887, Bihangkon. Sverksk. Vet. Akad. Handlingar, Stockholm, 13(4):29 (Nagasaki).

Johnius argentatus Fowler, 1933, U. S. Nat. Mus. Bull. 100, 12:394 (part) (India; China; Korea; Japan).

Pseudosciaena argentatus Tang, 1937, Amoy Mar. Biol. Bull. 2(2):65, pl. 1, fig. 1 (Tsingtao).

Nibea argentata Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):44 (China Sea; Simabara; Miya; Fusan; Siogama).

D. X/1/24-27; A. II/7; V. 1/5. L.I. with 48 tubular scales; l.tr. 6/10; predorsal scales 24. Depth in length 3.6; head 3.8. Eye in head 4.5; snout 3.1; interorbital 3.8; thickness of head 2.3; longest dorsal spine 2; longest anal spine 4.5; length of peduncle 1.1; its depth 2.6; depth of peduncle in its length 2.3.

Body oblong, compressed. Head conical. Mouth slightly oblique with the lower jaw somewhat included. Snout bluntly pointed, slightly projecting beyond the lower jaw when the mouth is closed. Maxillary reaching the vertical from posterior margin of orbit. Lips thin, with edge fringed, but not finely cut as in related species (e.g., *A. iherae* Jordan & Metz). Villiform teeth on jaws; the outer series enlarged, no enlarged teeth at symphysis of upper jaw; inner upper villiform teeth in a narrow band. The inner lower series also enlarged, outer villiform teeth in single or double series only. Vomer and palate edentate; 4 small pores on under side of mandibular symphysis. No barbels. Preopercular edge entire or weakly serrated. Operculum terminating in a single point. Branchiostegals 7. Gillrakers 7+12, extreme ones rudimentary, longest about as long as gill-filaments, 2.7 in eye diameter. Dorsal commences above base of pectorals, with a deep notch between spinous and soft portions. First dorsal spine very short, the third spine longest. Longest soft ray shorter than longest spine. Two series of scales cover base of soft dorsal only. Spinous dorsal, most of soft dorsal, and anal are devoid of scales. Pectorals slightly shorter than head. Ventrals about as long as pectorals. Anal commences under middle of soft dorsal, its origin opposite to 11th dorsal ray. First anal spine minute, second spine weak and short, about one-half less than the length of first anal ray. Caudal cuneate. Sensory tube of

lateral line branched posteriorly. Scales crenulate, not truly ctenoid on body, those below spinous dorsal with 18-25 basal radii; 46-50 apical denticles. Snout, cheek, opercles covered by scales. Intestine short. Pyloric caeca 7. Air-bladder simple, thick-walled, extending the whole abdominal cavity, with about 28 pairs of appendages. Peritoneum gray. Vertebrae 24.

Brownish-yellow, darker above and pale below; opercle with a distinct black spot. Edge of spinous dorsal black, other fins pale. Iris yellowish tint. Mouth colorless.

One specimen 240 mm. to base of caudal from Shantung; another from Fusan, Chosen, 210 mm. Rather rare in Chusan and South China Seas, abundant in North China and Japanese Seas.

Argyrosomus iharae (Jordan & Metz)

Sciaena iharae Jordan & Metz, 1913, Mem. Carnegie Mus. 6(1):37, pl. 7, fig. 2 (type locality: Fusan, Korea); Sowerby, 1930, The Naturalist in Manchuria 4:188 (compiled).

Nibea sina Liu (not Schlegel nor Cuv. & Val.), 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1).20, fig. 11 (Chusan).

Nibea iharae Mori & Uchida, 1934, Jour. Chosen Nat. Hist. Soc. No. 19, p. 14 (Fusan).

D. X/1/28-29; A. 11/7; V. 1/5. L.I. with 47-52 tubular scales; 1.tr. 5.7/14; predorsal scales about 30. Depth in length 3.2-3.7; head 3.2. Eye in head 4.8; snout 3.5; interorbital 3.9; thickness of head 1.8-2.1; length of peduncle 1.2; its depth 3. Depth of peduncle in its length 2.2-2.4.

Body thick, oblong and compressed. Head large; mouth wide, oblique with mandible slightly shorter than upper jaw and the maxillary extending to under the posterior third of orbit. Nostrils separated by a short distance, the posterior nostril close to anterior margin of orbit. Cheek high; interorbital convex. The whole head is covered by scales except lips, jaws and chin. Rostral margin slightly lobate, incisions shallow. Chin with 4 pores at symphysis and 2 circular small pores in front. Snout also with a few pores. No barbels. Preopercular margin weakly serrated, its vertical limb slightly slanting backward; operculum terminating in two points, not extending beyond the gill-membrane; the lower median point longer than the upper. Villiform teeth on jaws, no large canine; the outer upper series and the inner lower series of teeth enlarged, becoming pungent, conical. The outer enlarged teeth of upper jaw rather widely set. Branchiostegal 7; gillrakers, 7+12, 4 of upper and 4 of lower branch rudimentary; longest 2.7 in eye diameter. Pectorals nearly as long as head. Dorsal origin above base of pectorals. First dorsal spine longest, about one-third of head length. Soft dorsal long, separated from the spinous dorsal by a deep notch. Spinous dorsal half as long as soft D. Anal commences under middle of soft dorsal, opposite to 12th or 13th soft dorsal ray. First anal spine minute, second spine slender, about 3.5-5.5 or about

equal to eye in head. Peduncle not elongate, 1.2 in head. Base of soft dorsal and of anal covered by one or two series of small scales. No small cycloid scales on dorsal and anal. Scales on the side of body, top of head, cheek, opercles and orbital ring weakly ciliate (not strongly ctenoid), snout and some on ventral surface of head cycloid. Caudal cuneate. Scales of moderate size, ctenoid, with 18-32 basal radii (divergent). The scales are about as long as wide. The apical denticles are obsolete. Intestine short; pyloric caeca 5. Air-bladder simple, thick-walled, lying the whole length of abdominal cavity, provided with 22 pairs of appendages. Peritoneum blackish. Vertebrae 25 (24).

Yellowish-silvery above, pale below. A distinct dark spot at operculum. Marginal portion of spinous and soft dorsal and caudal dusky.

Common food fish in Chusan Islands, Chekiang Province. No silvery band along L.I., reaching size of 300 mm. Young individuals 20 to 75 mm. usually found along the coastal waters of Chekiang.

Sciaena Linnaeus

Sciaena Linnaeus, 1758, Syst. Nat. 10th ed. 1:288 (Type, *Sciaena cirrosa* Linnaeus, designated by Bleeker, 1876, Arch. Neerl. Sci. Nat., Haarlem 11. 326.)

Sciaena Bonnaterre, 1788, Tabl. Ichth., p. LIV (119). (Type, *Sciaena cirrosa* Linnaeus) (Error.)

Umbrina Cuvier, 1817, Regne Animal. 2:297. (Type, *Sciaena cirrosa* Linnaeus, designated by Gill, 1861, Proc. Acad. Nat. Sci. Phila., p. 86)

Attulus Gistel, 1848, Naturg Thuerreich, p. 109. (Type, *Sciaena cirrosa* Linnaeus, monotypic.)

Ctenosciaena Fowler & Bean, 1923, Proc. U. S. Nat. Mus. 63 (art. 19) 15. (Type, *Sciaena dubia* Fowler & Bean, orthotypic.)

Oblong, compressed, head bluntly pointed; snout very prominent with several pores at tip; margin of rostral fold incised into 4 lobes not covering the lip; maxillary concealed for most part under preorbital sheath; mouth small, inferior, horizontal with the lower jaw included. Five pores on chin, the median one sometimes obsolete; a single barbel on chin. Premaxillary teeth villiform, arranged in a band, the outer series slightly enlarged and rather closely set. Mandibular teeth uniformly villiform, none enlarged; vomer and palatines edentate. Eyes large, in anterior half of head; preopercular limb slightly slanting backward with round angle, distinctly serrated: operculum terminating in two flat spines, lower longer. Gillrakers short and rudimentary, less than 15 on anterior arch; pseudobranchiae. Dorsal with 10 to 13 spines and 22-31 rays, deeply incised, first spine minute, second, third and fourth longest, sometimes filamentous; soft dorsal low; anal short, second anal spine strong, robust, longer than half of the first anal ray; pectorals acute; ventrals shortly filamentous. Scales on head and body ctenoid or cycloid; soft dorsal and anal covered by small cycloid scales; caudal cuneate, rounded, truncate, or emarginate.

Tropical and subtropical coastal fishes widely distributed in southern China, Cochin-China, Malay Peninsula, India, Philippines, Indo-Australian Archipelago, Red Sea, and Madagascar.

Analytical Key to Chinese Species of *Sciaena*

1. D. 24-26. Scales cycloid; 2nd, 3rd and 4th dorsal spine filamentous; barbels short, robust, shorter than eye..... *dussumieri*
2. D. 26-28. Scales on anterior head cycloid, otherwise stenoid; no filamentous dorsal spine; barbel slender, longer than eye. *russelli*

Sciaena dussumieri (Cuv. & Val.)

Umbrina dussumieri Cuvier & Valenciennes, 1833, Hist. Nat. Poiss. 9 : 481 (type locality: Coromandel); Gunther, 1860, Cat. Fish. Brit. Mus. 2:278 (East Indies); Day, 1865, Proc. Zool. Soc., London, p. 18 (Cochin; Malabar); 1865, The Fishes of Malabar, p. 48; 1876, The Fishes of India, pt. 2, p. 183, pl. 43, fig. 2-3 (India); 1889, Faun. Brit. India, Fishes 2:110; Pellegrin, 1905, Bull. Soc. Zool. France 30:84 (Baie d'Along, Tonkin); Jordan & Seale, 1906 (1907), Bull. Bur. Fish., Washington 26:25 (Cavite); Evermann & Seale, 1906, Bull. Bur. Fish., Washington 26:87 (San Fabian); Jordan & Richardson, 1907, Bull. Bur. Fish., Washington 27:261 (Mamla); Zugmeyer, 1913, Abh. bayer. Akad. Wiss., math.-phys. Kl. 26(6):11 (Mekran); Pellegrin, 1914, Bull. Soc. Zool. France 39:224 (Port Dauphin, Madagascar); Gilchrist & Thompson, 1917, Ann. Durban Mus. 1(4):351 (compiled); Chu, 1931, Index Fisc. Sinense, p. 135 (compiled).

Sciaena dussumieri Bleeker, 1874, Verh. Akad. Amsterdam 14(4):56 (Sumatra; Singapore; Banka; Java; Ambioina); 1877, Atlas Ichth. Vol. 9, pl. (4)887, fig. 4; Fowler 1918, Copeia, No. 55, p. 64 (Philippines); Fowler & Bean, 1923, Proc. U. S. Nat. Mus. 63 (art. 19):17 (Philippines); 1927, 71 (art. 10):8 (Sumatra); Fowler, 1927, Proc. Acad. Nat. Sci. Phila., p. 286 (Orion; Philippines); 1933, U. S. Nat. Mus. Bull. 100, 12:412 (Luzon, off Daet, Tacloban, San Fabian, Zamboanga, Philippines; Bombay; Natal); Weber & de Beaufort, 1936, Fish. Indo-Austr. Archipel 7:542 (Singapore; Banka; Sumatra; Java; Bali; Ambon); Tang, 1937, Amoy Mar. Biol. Bull. 2(2):77 (Hainan Island).

Umbrina amblycephalus Bleeker, 1855, Nat. Tijdschr. Nederl.-Ind. 8:412 (type locality: Ambioina); Günther, 1860, Cat. Fish. Brit. Mus. 2:278 (compiled); Kner, 1868, Sitz.-ber. Akad. Wiss. Wien, math.-nat. Kl. 58 (pt. 1): 320 (Formosa); Schumeltz, 1869, Cat. Mus. Godeffroy No. 4, p. 16 (East Indies); 1874, No. 5, p. 26 (Akyab); Karohi, 1881, Term. fuzetek, 5:159 (Canton).

D. X/1/24; A. II/7. L.l. about 50 tubular scales; l.tr. 7/13 to abdomen. Depth in length 3.7; head 3.2. Eye in head 5.2; snout 3.2; postorbital 1.9; interorbitals 3.8; pectoral spine 1.3; ventral 1.8; peduncle length 1.2; peduncle depth 3.4; second anal spine 4.7; first anal ray 3.2; barbel 17.

Oblong compressed, rather thick, dorsal profile generally arched, ventral profile straight, a form well adapted for bottom feeding; predorsal compressed, somewhat keel-like. Snout round, very prominent, rostral fold overhanging lip, with 8 pores on tip, upper 3 small, in a transverse series, lower 5 large, situated in or immediately above incisions of rostral fold, which is provided with 4 distinct lobes. Lips thick, fringed along edge in contact with teeth; 5 distinct pores on chin, immediately behind median pore a short robust

barbel, one-third of eye diameter. Mouth inferior, small, horizontal; lower jaw, short and included. A broad band of villiform teeth on premaxillary, outer series conical, slightly enlarged, stronger toward anterior; villiform teeth on mandible uniform, devoid of conspicuous enlarged ones, with an edentulous interspace at symphysis. Tip of tongue round, free; maxillary almost entirely concealed under preorbital sheath, extending to middle of orbit; preorbital limbs crenulate, not provided with distinct serrae, angle rounded, and very slightly slanting backward; opercle terminating in a short, flat and blunt point. Eyes high, above level through commencement of gape, in anterior half of head, two approximate nostrils on each side, posterior one large, oval, close to eye; anterior one small; interorbital convex; scapular flap small, entire. Gillrakers very short, 4+7, some rudimentary, longest about 7 in eye, or 4 in filaments; pseudobranchiae.

Dorsal deeply incised, first spine minute, second, third and fourth spines prolonged and filamentous, almost to body height, soft dorsal rather low; anal commences below tenth soft dorsal ray, first spine minute, second spine robust, equal to or slightly longer than eye diameter, more than half length of first ray. Scales cycloid, on head smaller; soft dorsal and anal covered by small scales nearly to edge; caudal cuneate.

Color in formalin uniformly dark above and pale below, spinous dorsal black terminally, other fins pale, abdomen white with some brownish specks. Mouth cavity white.

One specimen 166 mm. to base of caudal collected from Yang-kiang (扬江), Kwangtung.

A widely distributed fish ranging from South China Sea to Madagascar.

Sciaena russelli (Cuv. & Val.)

Labrus spec. Russell, 1803, Fish. Vizagapat. 2:13, pl. 118 (unfinished figure).

Umbrina russelli Cuvier & Valenciennes, 1830, Hist. Nat. Poiss. 5: 178 (Coromandel); Lay and Bennett, 1839, Zool. Beechey's Vog., p. 51 (Macao); Richardson, 1846, Ichth. China, Japan, p. 226 (China Sea; Canton); Chu, 1931, Index Pisc. Sinen., p. 135 (compiled).

Umbrina russelli Gunther, 1860, Cat. Fish. Brit. Mus. 1:278 (Malayan Peninsula); Kner 1865, Reise Novara, Fische, p. 131 (Ceylon); Day, 1876, The Fishes of India, pt. 2, p. 183, pl. 43, fig. 4 (India); 1889, Faun. Brit. India, Fishes 2:110; Elera, 1895, Cat. Fauna Filip. 1:500 (Manila, Luzon); Dunker, 1903 (1904), Mittteil. Naturh. Mus. Hamburg 21:154 (Bandar Mahbarani); Tirant, 1929, Serv. Océanogr. Pêches Indo-Chine, Note 6, p. 9, 16 (169) (Hue River).

Umbrina russelli Cantor, 1849, Jour. Asiatic Soc. Bengal 18 (pt. 2):1053 (Penang; Malay Peninsula; Singapore); Jordan & Seale, 1906, Bull. Bur. Fish., Washington 26:25 (Cavite); Evermann & Seale, 1906 (1907), Bull. Bur. Fish., Washington 26:87 (San Fabian); Seale, 1901, Phil. Jour. Sci. 5(4):279 (Borneo, Sandakan).

Umbrina rudellii Gorgoza, 1885, Anal. Soc. Espan. Hist. Nat. Madrid 14 : 73 (Manila).

Sciaena russelli Bleeker, 1874, Verh. Akad. Amsterdam 14(4) : 58 (Singapore; Bintang; Banka; Java; Madura; Celebes); 1877, Atlas Ichth., Vol. 9, pl. (3) 386, fig. 2; Fowler, 1927, Proc. Acad. Nat. Sci. Phila., p. 286 (Philippines); Weber & de Beaufort, 1936, Fish. Indo-Austr. Archipel. 7 : 544 (Indo-Australian Archipelago).

Sciaena russeli Fowler & Bean, 1923, Proc. U. S. Nat. Mus. 63 (art. 19) : 17 (Philippines).

Umbrina kuhlii Cuvier, 1830, Hist. Nat. Poiss. 5 : 170 (type locality : Java).

Johnius kuhlii Bleeker, 1865, Nederl. Tijdschr. Dierk. 2 : 56 (Amoy).

Sciaena indica Fowler, 1933, U. S. Nat. Mus. Bull. 100, 12 : 410 (Caringo Island; Manila; Sorsogon; Sandakan (Borneo); San Fabian; Philippines).

D. X/1/26; A. II/7. L.l. 48 tubular scales; l.tr. 5/12 to abdomen. Depth in length 3.7; head 3.3. Eye in head 4.4; snout 3.5; post-orbital space 1.8; interorbital 4.4; pectoral 1.4; longest dorsal 2.2; ventral 1.6; peduncle depth 1.25; its length 3.1; second anal spine 2.7; first anal ray 2.3; barbel 7.

Oblong compressed, head bluntly pointed, snout very prominent with 3 pores in upper transverse row and 5 in or immediately above incisions of rostral fold; margin of rostral fold incised into 4 lobes, not covering the lip; lips thin; maxillary concealed for most part under preorbital sheath, extending to middle of eye; mouth small, horizontal, entirely inferior; lower jaw short included, 5 pores on chin, median one small, at front base of barbel. A series of slightly enlarged and closely set teeth on upper jaw, behind which is a broad band of villiform teeth with an edentulous interspace at symphysis; on mandible the band of villiform teeth uniform; vomer and palate edentate; tongue free with roundish tip. A barbel at chin slender, five-eighths of eye diameter, and nearly extending to corner of gape. Eye large, high, in anterior half of head; interorbital high, flat; nostrils two on each side, posterior one large, close to eye; preopercular limb slightly slanting backward with round angle, distinctly serrated; operculum terminating in two flat spines, lower longer. Gillrakers short and rudimentary, 4+8 on anterior arch, longest one-tenth eye diameter; pseudobranchiae. Dorsal deeply notched, first dorsal spine minute, fourth spine longest, second, third and fifth about subequal, soft dorsal lower than spinous dorsal; anal commences below 12th soft dorsal ray; first anal spine minute, second anal spine strong, nearly as long as first ray or longer than eye diameter; pectoral fin acute; ventral fin shortly filamentous. Scales on head and body ctenoid, except on base of soft dorsal and anal; small cycloid scales high up soft dorsal and anal; caudal cuneate.

Color uniform, spinous dorsal dusky, other fins pale; mouth cavity white.

One specimen 115 mm. to base of caudal, probably collected from Kwangtung.

Johnius Bloch

Johnius Bloch, 1793, Naturg. ausland. Fische, pt. 7, p. 132. (Type. *Johnius carutta* Bloch, designated by Gill, 1861, Proc. Acad. Nat. Sci. Phila., p. 85.)

Corvina Cuvier, 1829, Regne Animal, 2nd ed., Vol. 2, p. 173. (Type, *Corvina nigra* Cuvier = *Sciaena umbra* Linnaeus, designated by Gill, 1861, Proc. Acad. Nat. Sci. Phila., p. 85.)

Apeches Pistel, 1848, Naturg. Thierreich., p. IX. (Type, *Johnius carutta* Bloch, virtually, as *Apeches* Gistel proposed to replace *Johnius* Bloch.)

Body oblong, compressed. Head small; snout prominent, roundly pointed, with 4 pores at tip, 3 above and a large median one below near the margin. Rostral fold deeply incised into 4 distinct lobes covering the premaxillaries. Mouth small, inferior and horizontal, with the lower jaw included. Lips thick, smooth, mostly exposed; maxillary almost entirely concealed by preorbital sheath, with the expanded portion truncate; 5 large pores on chin; median pore crescent-shaped, with a flat tubercle in it; outer four pores slit-like or circular; no barbel. The outer series of premaxillary teeth enlarged, usually slender, but hardly conical or canine-like; behind this enlarged series a broad band of villiform teeth; mandibular teeth uniform, arranged in 2 to 4 series; vomer and palate edentate. Tongue short with tip roundish and free. Eyes large in anterior half of head; preopercular limb finely serrated, slightly slanting backward with broadly round angle, no enlarged serrae at angle; operculum terminating in 2 flexible and flat spines, lower the longer. Branchiostegals 6-7; gillrakers short, not more than 16 in anterior arch. Pseudobranchiae present. Spinous dorsal with a deep notch; first dorsal spine minute, second or third longest; soft dorsal and anal covered by small cycloid scales. Dorsal VIII-X/1/22-34; anal 3 times in the base of soft dorsal, with 2 spines and 7 to 8 rays; the second anal spine usually slender and short; caudal cuneate. Head usually covered by cycloid scales and the body by ctenoids. Mouth cavity white. Vertebrae 24-26.

Fishes of tropical and subtropical seas, widely distributed in Indo-Australian Archipelago, Philippines, Coast of India to China, Australia, east coast of Africa; some species in tropical Atlantic. *Johnius belengerii* is the only species commonly found in the coastal waters of Shantung, Kiangsu, Chekiang, Fukien and Kwangtung Provinces.

Johnius belengerii (Cuvier)

Corvina belengerii Cuvier, 1830, Hist. Nat. Poiss. 5 : 120 (type locality: Malabar).

Corvina belengerii Valenciennes, 1834, Voy. Ind. Orient. Belanger, Zool., p. 357 (East Indies); Günther, 1860, Cat. Fish. Brit. Mus. 2:303 (Sea of Penang); Day, 1865, The Fishes of Malabar, p. 54 (Malabar); Elera, 1895, Cat. Fauna Filip. 1 : 502 (Luzon, Santa Cruz; Cavite).

Corvina belengeri Day, 1870, Proc. Zool. Soc., London, p. 684 (Andamans).

Corvina belengeri Borodin, 1930, Bull. Vanderbilt Mar. Mus., 1 (art. 2) . 53 (Saigon River; India).

Sciaena (Corvina) belangeri Steindachner, 1866, Verh. zool.-bot. Ges. Wien. 16:771 (Calcutta).

Sciaena belangeri Day, 1876, The Fishes of India, pt. 2, p. 191, pl. 44, fig. 5 (India; Bombay); Johnstone, 1903, Fish. Malayensis, Annandale and Robinson, Zool. 2:293 (Patani and Jhering Coasts); Weber, 1913, Nova Guineae 9 (pt. 3):588 (Lorentz River; Varen River; Sermowai River); Barnard, 1927, Ann. S. Afr. Mus. 21(pt. 2):572 (Natal Coast).

Sciaena belangeri Day, 1889, Faun. Brit. India 2:120 (India); Regan, 1911, Trans. Zool. Soc. London 20 (part 6):276 (Mimika River, New Guinea); Hardenberg, 1931, Treubia 13(1):131 (Rokan Mouth, Sumatra).

Sciaena belangerii Norman, 1922, Ann. & Mag. Nat. Hist., ser. 9, 9:321 (Natal).

Johnius belangeri Cantor, 1849, Jour. Asiatic. Soc. Bengal, 18(2):1047, 1850 (Penang; Malayan Peninsula; Singapore); Bleeker, 1873, Nederl. Tijdschr. Dierk. 4:118 (China); 1874, Verh. Akad. Amsterdam 14(4):46 (Sumatra, Nias, Penang; Singapore; Banks; Java; Borneo; Philippines); 1877, Atlas Ichth. Ind. Neerl., Vol. 9(4):387, fig. 1 (Indo-Australian Archipelago).

Johnius belangeri Kner, Reise Novara, Fische, p. 133 (Java; Manila) Fowler, 1937, Bombay Nat. Hist. Soc. 32(2):260 (Bombay); 1928, Mem. Bishop Mus. 10:235 (on Day); Wang, 1935, Contr. Biol. Lab. Sci. China 10 (9):455, (Chefoo, Shantung); Chu, 1931, Index Pisc. Sinen., p. 134.

Corvina kuhlii Cuvier, 1830, Hist. Nat. Poiss. 5:121 (type locality: Labouane River, Java).

Corvina lobata Cuvier, 1830, Hist. Nat. Poiss. 5:122, pl. 107 (type locality: Malabar); Gunther, 1860, Cat. Fish. Brit. Mus. 2:304 (compiled); Day, 1865, The Fishes of Malabar, p. 55 (compiled).

Johnius cooter Bleeker (not Cuvier), 1845, Nat. Geneesk. Arch. Ned. Ind. 2:523 (Batavia).

Johnius belengerii Fowler, 1933, U. S. Nat. Mus. Bull. 100, 12:382 (Bombay, India); Lin, 1934, Ling. Sci. Jour. 13(4):681 (Foochow, Fukien); Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):13 (copied); Tang, 1937, Amoy Mar. Biol. Bull. 2(2):76 (Amoy); Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):55 (Ganzan, Chosen).

D. X/1/25-31; A. II/8. L.l. 44-49; l.tr. 4-6/8-10 to anal origin. Depth in length 3.4-3.9; head 3.1-3.4. Eye in head 4.1-4.5, 1-1.3 in snout; snout 3.5; postorbital 1.9; interorbital 4.5; pectoral 1.6; second dorsal spine 2; ventral 1.6; second anal spine 3-3.5, always longer than eye diameter. Length of caudal peduncle 1.2 in head; depth 3.4 in head and 3 in its length.

Oblong, compressed, rather elongate in young, but becoming thick and deep with age. Head small, broadly pointed, with the snout very prominent; 4 pores on tip of snout, upper 3 in a curved row over the lower large median one immediately above the rostral margin, which is deeply incised into 4 lobes, some more pores usually present on side of snout. Mouth small, inferior, and horizontal with lower jaw included, maxillary almost entirely concealed under the preorbital sheath; its posterior expanded portion with rounded upper angle. Lips thick, striated, with marginal fringes inserted in between the teeth; 5 large pores on chin, the median one provided with a flat tubercle which is connected with chin in front, the lateral pair immediately behind sometimes slit-like, the outer pair always

large and circular. The tubercle in median pore not prolonged to form a barbel. Outer series of premaxillary teeth enlarged, but never conical or canine-like, the villiform band behind rather broad; mandibular teeth more or less uniformly villiform, arranged in 3 series toward symphysis, posteriorly 2 series; vomer and palate crenulate. Tongue short, with round tip free. Eyes large in anterior half of head, lower margin just above level through the commencement of mouth cleft. Nostrils double on each side, posterior one large, circular and close to eye. Interorbital broadly convex, nape gently elevated. Preopercular limb feebly serrated, quite distinct in young specimens, slightly slanting backward and with broad, round angle devoid of large serrae. Operculum terminating in 2 flexible and flat spines, the lower longer, but neither of them extending beyond the gill-membrane. Branchiostegals 7. Gillrakers 5+9-12, very short, not stout, the extreme two of upper arch and 4-6 of lower arch rudimentary, longest only half as long as filaments, which are contained 2.5 times in eye diameter. Pseudobranchiae. One dorsal, spinous portion with a deep notch, first spine minute, second longest. Small cycloid scales thinly cover soft dorsal and anal nearly to tip. Pectorals short; first ray of ventral filamentous, not extending to vent. Anal commences below middle of soft dorsal or opposite to 13th or 14th dorsal ray; the whole anal base 4 times in soft dorsal base, soft anal base alone 5 times; second anal spine robust, longer than eye diameter and three-fourths first anal ray; caudal wedge-shaped with the middle rays elongate. Small cycloid scales on snout, cheek, soft dorsal and anal; ctenoid scales present on opercles, body, chest, and caudal peduncle. Length of scales below spinous dorsal shorter than width and with 9 basal radii. Post-temporal round, strongly ctenoid. A small elongate scale at pectoral axilla. Vertebrae 25.

Mouth cavity white. Body dark above and pale below. The scales on upper half of back each with a speck forming six or seven oblique series of marking. Spinous dorsal black terminally, other fins pale; opercular blotch present; pectoral base colorless.

Twenty-six specimens 112-182 mm. to base of caudal collected from Chusan, Haimen (海門), and Wenchow in Chekiang, one specimen 122 mm. from Foochow, two specimens 135-147 mm. from Yankiang, Kwangtung Province. From all the records *belengerii* is the most common species of the genus *Johnius* found in the coastal waters of China.

The fish with second anal spine rather robust, "longer than eye diameter, and more than half length of first ray," described and referred to *Johnius dussumieri* (Cuv. & Val.) by Wang in 1935, seems not to differ much from *Johnius belengerii* (Cuv. & Val.) beyond species variation.

Wak new genus

Bola Buchanan-Hamilton, 1822, The Fishes of the Ganges, p. 114. Type: *Bola coitor* Buchanan-Hamilton, 1822, The Fishes of the Ganges, p. 75, 308, pl. 27, fig. 24 (type locality: Ganges River as far as Kanpur and Jumna River to Agra).

Oblong, compressed, snout bluntly pointed, with 4 pores, upper 3 in a curved transverse series, lower one larger, immediately above the lobate rostral margin; lateral incision of rostral margin deep. Mouth of moderate size, slightly oblique, with jaws about equal in front, or lower jaw slightly longer than upper; maxillary concealed for most part under preorbital sheath; no orifice in maxillary. Outer series of upper and inner series of lower teeth distinctly enlarged, no true canine; 5 conspicuous pores on chin as in the case of *Johnius*; no barbels. Eyes entirely in anterior half of head, and above horizontal level through commencement of mouth cleft; upper limb of preoperculum slightly slanting backward, its angle round, limbs and angle with fine but distinct serrae which are longer at angle. Branchistegals 7; gillrakers few in number, more than 14 on anterior arch, moderately long, some rudimentary; pseudobranchiae. Spinous dorsal deeply incised, with 10 to 11 spines, shorter than soft dorsal which is thinly covered by small cycloid scales, with 26 to 33 rays; anal short with 2 spines and 7 to 8 rays, second anal spine strong, longer than eye diameter. Scales on head cycloid, on body ctenoid; covering at least half way up soft dorsal and anal fins. Vertebrae 24 to 25.

Fishes of temperate and tropical zones, living in seas of middle and southern China, Cochin-China, Indo-Australian Archipelago, Burma, and India: two species known in China, attaining medium size, valued as food fish. *Wak tingi* is fairly common in Chusan market in the months of October and November.

As Fowler has stated (1933, U. S. Nat. Mus. Bull. 100, 12:371) that, "Bola Buchanan-Hamilton can not be admitted as a sciaenid as its tautonymic genotype, *Cyprinus bola*, is a Cyprinid," this new generic name *Wak* is now established to take the place of *Bola*.

Wak is a Chinese vernacular name for sciaenids of this group.

It is closely allied to *Johnius* and *Nibeia*, but differs from the former in having the inner row of mandibular teeth enlarged and the jaws about equal in front, and from the latter in having soft dorsal and anal scaly.

Analytical Key to Species of Wak

1. Second anal spine very strong, nearly as long as first anal ray, 1.9 or less in head; D. X/1/28; A. II/7; jaws equal in front; gillrakers 5+9 on anterior arch *cuja*
2. Second anal spine of moderate strength half as long as or slightly longer than first anal ray, equal to eye diameter or 4.3-4.7 in head; D. IX X/1/29 to 33; A. II/7-8; gillrakers 5+13, short, some rudimentary .. *tingi*

Wak cuja (Buchanan-Hamilton)

Bola cuja Buchanan-Hamilton, 1822, The Fishes of the Ganges, p. 81, 369, pl. 12, fig. 27 (type locality: Ganges estuaries).

Corvina cuja Cuvier, 1830, Hist. Nat. Poiss. 5:96 (copied); Blyth, 1860, Jour. Asiat. Soc. Bengal, 29:141 (Sitang River); Gunther, 1860, Cat. Fish. Brit. Mus. 2:300 (Calcutta).

Sciaena cuja Day, 1876, The Fishes of India, pt. 2, p. 187 (estuaries of Ganges); 1889, Faun. Brit. India, Fishes 2: 115; Jordan & Snyder, 1901, Annotat. Zool. Japonen. 3:81 (India, not in Japan); Tirant, 1929, Serv. Océanogr., Pêches Indo-Chine, Note 6, p. 169 (Cochin-China).

?*Johnius serratus* Schneider, 1801, Syst. Ichth., Bloch, p. 76, (type locality: Tranquebar).

Sciaenoides aspe, Blyth, 1860, Jour. Asiat. Soc. Bengal 29:140 (type locality: Sitang River).

Johnius cuja Chevey, 1934, Inst. Oceanogr. Indo-Chine, Sta. Mar. Cauda, Note 7, p. 170.

D. X/1/28; A II/7. L.l. 50-52 tubular scales, l.tr. 7/13 to abdomen. Depth in length 3.5; head 3.3. Eye in head 4.5; snout 3.8; postorbital 1.8; interorbital 5; pectoral 1.7; longest dorsal spine 1.8; ventral 1.6; second anal spine 1.9; peduncle length 1.3; its depth 3.5.

Oblong, compressed; snout bluntly pointed with 3 pores (middle one not conspicuous) in a transverse series, and with a lower large circular pore near rostral margin; rostral fold more or less overhanging the lip, divided by 3 incisions to form two rather broad lobes, extreme incisions deeper. Mouth of moderate size, slightly oblique with jaws about equal in front, or the lower scarcely shorter than upper; maxillary extending to vertical from hind border of pupil, slipping for most part under preorbital sheath, except lower half of posterior dilated portion, not provided with circular orifice as in *Collichthys* and *Pseudosciaena*. The outer series of premaxillary teeth and inner mandibular teeth enlarged, but not canine-like; a narrow band of several series of villiform teeth behind enlarged series in upper jaw, and on lower jaw one or two outer series of small teeth, some inserted between the enlarged ones. Round tip of tongue free; 5 conspicuous pores on chin as in the case of *Johnius*, but the median pore more or less slit-like on convex chin, lateral pores larger; no barbel. Eye entirely in anterior half of head and above the horizontal level through commencement of mouth cleft; posterior nostril circular, close to eye. Upper limb of preoperculum slanting backward, its angle round, all limbs and angle with fine but distinct serrae which are longer on angle. Branchiostegal 7; gillrakers 5+9, moderately long, extreme ones rudimentary, longest slightly shorter than filaments and about one-third as long as eye diameter. Pseudobranchiae. Spinous dorsal deeply incised; first dorsal spine short, second and third spines longest, somewhat more than half body depth; soft dorsal lower; first ray of ventral slightly filamentous; anal short, the second spine very strong, as long as first anal ray and slightly more than half the length of head. Anal com-

mences under 12th dorsal ray, its base contained 5 times in soft dorsal base; small, cycloid scales on soft dorsal and anal, extending upward to upper half of the fins. Scales on snout, interorbital, opercles and cheek are cycloid; but those on nape, body and tail ctenoid; scales on back below spinous dorsal wider than long, provided with 13 basal radii. Vertebrae 24.

Oblique streaks of small spots one on each scale above lateral line, the one just above pectoral horizontal; abdomen pale. Spinous dorsal black terminally. One row of dark spots at base of soft dorsal, another row of long stripes on dorsal edge; dark opercular blotch.

Two specimens 140-149 mm. to base of caudal collected from Yankiang District (陽江縣), Kwangtung.

Wak tingi (Tang)

Pseudosciaena tingi, Tang, 1937, Amoy Mar. Biol. Bull. 2(2):54, fig. 1 (Amoy).

D. IX/X/1/31-33; A. II/7-8. L.I. 48-50 tubular scales; l.tr. 6-7/9-10 to origin of anal. Depth in length 3.2-3.6; head 3.1-3.3. Eye in head 4.2-4.6; snout 3-3.3; postorbital 1.8; interorbital 3.7; pectoral 1.5; longest dorsal spine 2.3; ventral 1.7; second anal spine 4.6; first anal ray 2.6; peduncle length 1.4, its depth 3.

Oblong, compressed; snout bluntly round, slightly projecting, with 4 pores at tip, 3 in upper curved row and a larger one below near the lobate rostral margin, which is deeply incised into 4 slightly pointed lobes, lateral incision much deeper. Mouth inferior, slightly oblique; maxillary concealed for most part under preorbital sheath; extending to middle of pupil. No barbel. Five large, sometimes slit-like pores on chin, median one provided with a small tubercle. Bands of villiform teeth on both jaws, upper outer and lower inner series much enlarged and somewhat widely set. Inner villiform teeth of upper jaw in broad band, outer lower arranged in 2 or 3 series only. Vomer and palate edentate; no enlarged teeth visible when mouth is closed. Two nostrils on each side, posterior one large and circular, close to eye. Preopercular limbs crenulate, no strong serrae, angle round, slightly slanting backward; operculum terminating in two weak, flat spines the lower longer, gillrakers short, 5+13, anterior 8 of lower branch rudimentary, longest about one-third the filaments, which contain 3 times in eye diameter; pseudobranchiae present; branchial cavity black; mouth cavity yellowish-white. Spinous dorsal with a deep notch, first dorsal spine short, fourth spine longest; first ventral ray filamentous, not to vent; anal commences below 16th or 17th soft dorsal ray and ends below 23rd ray, caudal cuneate. Scales on head (interorbital and opercles included) cycloid; on body ctenoid. Lower third or half of soft dorsal and anal are thinly covered by small cycloid scales. Vertebrae 25 to 26.

Body color uniform, one opercular black blotch; spinous terminally a deep black, which continues into a narrow black band on edge of soft dorsal; two series of dark blue spots on back immediately below dorsal base and on base of dorsal, one on each ray; a small speck at upper corner of pectoral axilla; other fins pale; a silvery band along lateral line extending from upper angle of gill-opening to base of caudal, sometimes a second one between dorsal and lateral line faintly visible.

Six specimens 158 to 225 mm. to base of caudal, from Chusan, examined in the zoological laboratory of Chekiang Provincial Fisheries Experiment Station.

My specimens agree with Tang's *Pseudosciona tingi* in most respects, but have more dorsal rays. They differ from *Nibea mitsukurii* in having small scales on dorsal and anal. *Nibea cuja* has much stronger second anal spine than *tingi*.

(To be concluded)

**SOME TORTOISE BEETLES FROM SOUTHEASTERN CHINA
(COLEOPTERA: CHRYSOMELIDAE: CASSIDINAE)¹**

By J. LINSLEY GRESSITT

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and Museum, Lingnan University.*

This paper constitutes a report on the tortoise beetles collected on a trip² to southeastern China made by the writer during the summer of 1936. The material was collected in the eastern part of Kwangtung Province, the southeastern part of Kiangsi, and the southwestern corner of Fukien Province. Also included in the study are a few specimens collected at Kuliang and on Fukien Christian University campus in the Foochow region, northeast coast of Fukien Province, southeastern China, on a visit during the summer of 1934. The collection includes ten species of six genera. One of the species is described as new to science. The type specimen of this is placed on loan in the California Academy of Sciences, in San Francisco. Brief notes or descriptions are given for the other species.

Tribe Priopterini

Genus *Prioptera* Hope, 1840

1. *Prioptera whitei*³ *trabeata* Fairmaire

Prioptera trabeata Fairmaire, Ann. Soc. Ent. Belg. 32 : 46, 1888 (Kiangsi Province).

Prioptera whitei ab. *trabeata*, Spaeth, Col. Cat. 62 : 19, 1914.

A number of specimens were collected at various localities in southeastern China: Wong-sa-shue, alt. 600-700 meters, southeastern Kiangsi Prov., July 8-11. Hong Shan, alt. 700-950 meters, southeastern Kiangsi, June 22-28. Liung-chon Shan, alt. 800 meters, southwestern Fukien Prov., July 21; and Gang-keu, alt. 450 meters, southwestern Fukien Prov., July 24, 1936, J. L. Gressitt.

The specimens are fairly uniform in markings, as follows: Antennae brownish-testaceous, subhyaline, with last two segments contrastingly black, except for piceous tip of apical segment; head dirty testaceous, hyaline, reddish or piceous on central portion of occiput, mottled golden brown or piceous on eyes; pronotum somewhat rufo-piceous on central portion of disk or on either side of mid-line, with the remainder, including expanded margins, pale yellowish-testaceous, opaque or hyaline; scutellum yellowish or

¹ Contribution from Lingnan Natural History Survey and Museum.

² See Gressitt, J. L.: Notes on a Collecting Trip to Southeastern China. *Ling. Sci. Jour.* 16 (3) : 439-445, 1 map. 1937.

³ *Prioptera Whitei* Boheman, Cat. Col. Ins. Brit. Mus. 9 : 11, 1856 (central China).

reddish-testaceous; elytra with disk of each shining black except around the entire periphery, and the margins with a large, sub-rounded black spot on postero-lateral portion of each, the remainder of surface either opaque yellowish-testaceous or with the explanate margins pale amber-colored, hyaline, and the margins of disks dull yellowish-testaceous, somewhat reddish along suture. The black portion of the disk of each constitutes two-thirds to three-fourths of the diskal width and approaches most closely to the explanate margin below the humerus and to the suture posteriorly. The ventral surface is dull testaceous with a transverse black band on the metasternum and parts of the central portions of the abdominal segments blackish or piceous. The legs are dirty testaceous or yellowish with a vague pitchy spot at middle of femora. The pronotum is impunctate and the disks of the elytra are finely and irregularly punctured. Length 9.4-11 mm.; breadth 8.2-9 mm.

This species has been found only in southeastern China.

Tribe **Aspidomorphini**

Genus **Aspidomorpha** Hope, 1840

2. Aspidomorpha furcata (Thunberg)

Cassida furcata Thunberg, Nov. Ins. Spec. 5: 87, pl. 5, fig. 96, 1789 (Siam).

Cassida means Fabricius, Syst. Eleuth. 1: 398, 1801 (Sumatra).

Aspidomorpha furcata, Maulik, Faun. Brit. India, Col. Chrysom. (Hisp and Cassid.) 333, 1919.

Several examples were collected at Tsin-leong Shan, alt. 850 meters, Mei District, E. Kwangtung Prov., June 6; Liung-chou Shan, alt. 750 meters, Leong Shan region, south of Shanghai, southwestern Fukien, July 20; and Tai-yong, alt. 650 meters, northwest of Swatow, E. Kwangtung, Aug. 4, 1936, J. L. Gressitt.

The specimens are mostly pale hyaline testaceous with the disks slightly darker, the outer sides of elytral disks and bases of explanate margins pale reddish-brown to pitchy black. The post-scutellar projection is generally pale yellowish in front and reddish behind. There is a feeble, or incomplete, narrow, posteriorly arcuate, transverse band across elytral disks behind middle. Length 7-8.8 mm.; breadth 6.3-7.2 mm.

This species is distributed in Formosa, Hainan I., S. China, the peninsula of southeastern Asia, the Sunda Is., India and Ceylon.

Genus **Laccoptera** Boheman, 1855

3. Laccoptera quadrimaculata⁴ bohemani Weise

Laccoptera quadrimaculata var. *bohemani* Weise, Verh. Naturf. Ver. Brunn 48: 42, 1910 (S. China).

Several specimens were collected at Kuliang, alt. 700 meters, near Kushan Peak, July 28, 1934, and on the campus of Fukien

⁴ *Cassida quadrimaculata* Thunberg, Nov. Ins. Spec. 5: 86, pl. 5, fig. 94, 1789.

Christian University, alt. 20 meters, Aug. 1, 1934, Foochow area, northeast coast of Fukien Province, SE. China, J. L. Gressitt.

Some of the specimens have the elytral disks almost uniformly reddish-brown in color with the post-humeral dark band of the explanate margins almost non-existent and the posterio-lateral marginal spot of each side small and pitchy-brown instead of black. The sutural angles are narrowly blackish or pitchy brown. Length 8.6-9.3 mm.; breadth 7.2-8 mm.

This subspecies is found in Formosa, S. China, Hainan I. and Indo-China.

Tribe *Coptocyclini*

Genus *Thlaspida* Weise, 1899

4. *Thlaspida chinensis* Spaeth ?

Thlaspida chinensis Spaeth, Bestim Tabell. europ. Col. 95 : 64, 1926 (SE. Asia).

A large series of specimens was taken at the following localities: Tai-au-hong, alt. 500 meters, July 5, and Hong Shan, alt. 850 meters, July 15 and 16, southeastern Kiangsi Prov.; Liung-chon Shan, alt. 775 meters, July 21, and Gang-keu, alt. 450 meters, July 23, southwestern Fukien; and Tai-yong, alt. 650 meters, eastern Kwangtung, Aug. 6, 1936, J. L. Gressitt.

The posterio-lateral black bar of the explanate elytral margins is generally either distinct or lacking, rarely vestigial.

5. *Thlaspida japonica* Spaeth

Thlaspida japonica Spaeth, Suppl. Ent. 3 : 17, 1914 (Japan).

Coptocycla biramosa var. *a* Boheman, Monogr. Cassid. 4 : 464, 1862 (China).

Coptocycla biramosa, (nec Boheman) Kraatz, Deutsche Ent. Zeitschr. 23 : 272, 1879 (Japan and Pulo Penang).

A large series of specimens was taken at Gang-keu, alt. 400 meters, south of Shanghang, southwestern Fukien Prov., July 23-28, 1936, J. L. Gressitt.

The elytral disks are yellowish-testaceous mottled with pitchy brown, particularly on lateral declivities and anterior side of dorsal tubercle. The explanate margins are nearly colorless and transparent with the posterio-lateral pitchy brown spot on each side distinct and squarish. The ventral surfaces are pitchy red and the antennae are reddish-testaceous on basal half and pitchy brown apically. Length 7.5-10 mm.; breadth 6.6-8.5 mm.

These specimens seem not to differ from typical Japanese material, and are hardly distinct from specimens from Hainan Island. The species has been recorded from East China.

Genus **Metriona** Weise, 18966. **Metriona** sp.

Three examples were taken at Hong Shan, alt. 1,000 meters, southeastern Kiangsi Prov., June 29, 1936.

This species is apparently similar to *M. expressa* Spaeth (Entom. Mitteil. 3: 230, 1914, Yunnan).

7. **Metriona circumdata** (Herbst)

Cassida circumdata Herbst, Natursyst. Kafer 8:268, 1799 (India); Maulik, Fauna Brit. India, Col.: Chrysom (Hisp. and Cassid.) : 404, 1919.

Coptocycla circumdata, Boheman, Monogr. Cassid. 3: 279, 1855.

Metriona circumdata, Spaeth, Ann. Mus. Nat. Hung. J. 128, 1903.

Cassida U-fuscum Wiedemann, Zool. Mag. 2. 74, 1823.

One specimen was collected at Yim-na Shan, alt. 600 meters, eastern Kwangtung Prov., June 12, 1936, J. L. Gressitt; another specimen was taken on the campus of Fukien Christian University, Foochow, alt. 25 meters, Aug. 1, 1934, J. L. Gressitt.

The color is yellowish-testaceous with the basal margins of prothorax and elytra and elytral suture reddish. The explanate margins are very pale, hyaline and reticulated. The dorsal black margins are in the form of a large "U" reaching from humeral swellings to posterior portion of disk, with an incomplete stripe on basal two-fifths of elytral suture. Antennae testaceous with last segment pitchy in apical half. Ventral surface and legs testaceous except for brownish posterior margins of abdominal segments. Length 5 mm.; breadth 4 mm.

The specimen from Foochow is testaceous above with greenish reflections around lateral and subsutural elytral punctures, but has no black markings.

This species ranges from S. Japan through the Riukiu (Loochoo) Is., Formosa, Philippines, S. China and Indo-China to India.

Tribe **Cassidini**Genus **Cassida** Linnaeus, 17588. **Cassida discale** n. sp.

Small, rotundate-oval, only moderately convex. Disk of pronotum and elytra largely pitchy black; explanate margins pale yellowish-testaceous, hyaline, reticulate; ventral surfaces testaceous or pieaceous. Head dirty testaceous, reddish on labrum and middle of frons; eyes black, mottled with golden brown reflections, antennae pale reddish-testaceous, apical segment pitchy brown; pronotum whitish-testaceous, hyaline, subtransparent, reticulate, basal portion of disk pitchy black except for a small testaceous triangular spot at middle of basal margin, anterior portions of disk rufo-piceous at either side, paler and subtransparent on suprncephalic convexity; scutellum pitchy black; elytra with explanate margins whitish-testaceous and hyaline with minute yellowish-testaceous reticulations.

disk of each pitchy black and moderately shining, with some small, subconfluent, testaceous spots forming a common, posteriorly convex arcuate band behind middle, apical portion of disks brownish-testaceous; ventral surface of body irregularly variegated with yellowish and brownish-testaceous, metasternum dull rufo-piceous.

Head small, rounded oval; frons higher than wide, broader below, smooth and sparsely punctured; labrum short, oblong; eyes large, elongate-oval. Antennae reaching just beyond humeral angles of elytra, slender, slightly and gradually thickened apically; scape smooth, swollen in middle, one-half again as long as third segment; third to tenth subequal in length; fifth and following segments briefly clothed with pale golden hairs. Prothorax not quite as wide as elytra at humeral angles, transversely oval, slightly produced opposite scutellum, about two and one-half times as broad as long; explanate portions smooth and flattish; disk moderately swollen, sparsely and minutely punctured. Scutellum small, a little longer than broad, slightly narrowed, and broadly rounded apically, smooth. Elytra wide, broadly rounded posteriorly, only slightly narrower at humeral angles than at middle; explanate margins impunctate but with small, shallow depressions and irregularities; disk moderately convex, feebly raised at suture behind scutellum, deeply punctured, the punctures arranged in ten longitudinal rows at middle. Ventral surface shining, sparsely punctured on abdomen, except towards apex of last sternite. Length 5 mm.; breadth 4.2 mm.

Holotype (loan deposit, Calif. Acad. Sci.), Hong Shan, alt. 950 meters, southeastern Kiangsi Province, southeastern China, June 25, 1936, J. L. Gressitt.

Differs from *C. informis* Boheman (Monogr. Cassid. 4:312, 1862) in having the disks of pronotum and elytra pitchy black, with the explanate margins very pale, the scutellum entirely black instead of brown with black border, the frons punctured, etc.

9. *Cassida lineola* Creutzer

Cassida lineola Creutzer, Ent. Vers., 119, pl. 2, fig. 23, 1799 (Europe);

Spaeth, Verh. zool.-bot. Ges. Wien 64: 138, 1914.

Cassida nigroguttata Gorham, Proc. Zool. Soc. London: 281, 1885 (Japan).

A single specimen was taken at Wong-sa-shue, alt. 500 meters, southeastern Kiangsi Prov., July 11, 1936, J. L. Gressitt.

This is the southernmost record for this palearctic species, ranging from Europe to Japan.

10. *Cassida obtusata* Boheman

Cassida obtusata Boheman, Monogr. Cassid. 2: 405, 1854 (India and China); Spaeth, Suppl. Entom. 3: 19, 1914.

One example was taken at Yim-na Shan, alt. 600 meters, eastern Kwangtung Prov., June 13, 1936, J. L. Gressitt.

The surface is largely testaceous, the elytral disks pale greenish-brown. The meso- and meta-sterna and abdomen are black.

Erratum

In a preceding paper: "Some Tortoise Beetles from Hainan Island," *Ling. Sci. Jour.* 17 (2): 185-193, 1938, an error was made under *Thlaspida Japonica*, no. 11. The last sentence should have read, "This new Hainan record represents the southernmost known distribution for the species", instead of *genus*.

中國東南之龜形甲蟲（鞘翅目；金花蟲科：龜形葉蟲亞科）

嘉理思著

嶺南大學自然博物採集所

(摘要)

此篇刊載龜形甲蟲十種，分隸六屬，計屬新種者有產自江西項山之 *Cassida discale* 一種。

PARASITIC TREMATODES OF TREE SPARROWS, *PASSER MONTANUS TAIVANENSIS* HARTERT, FROM CANTON, WITH A DESCRIPTION OF THREE NEW SPECIES¹

By L. Y. WU (WU LEUNG YUE (吳亮如)

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The parasitic trematodes described in this paper are a part of the helminthological collection from ninety-one sparrows collected from Canton. Four species, namely, *Prosthogonimus querquedulae* Yamaguti, 1933, *Philophthalmus ocululae* n. sp., *Leucochloridium muscularae* n. sp., and *Leucochloridium passeri* n. sp., are herein presented.

***Prosthogonimus querquedulae* Yamaguti, 1933 (fig. 1)**

Specific Diagnosis.—A single single specimen was collected. The living specimen is somewhat transparent and very active. Anterior half of the body very extensible. Body elongated and more or less flattened. Cuticle armed with spines. Fixed specimen oval and somewhat pointed at both ends, length 4.32 mm., maximum width at level of testes 1.93 mm.

Oral sucker subterminal, 0.284 mm. long \times 0.257 mm. wide. Ventral sucker situated at anterior third of body, 0.688 mm. in diameter. Pharynx short, pharynx muscular, 0.164 mm. wide \times 0.147 mm. long. Oesophagus about twice as long as pharynx. Intestinal cæca pass backward laterally to as far as posterior fourth of body length.

Testes somewhat oval, at equator of body and obliquely opposite each other, left one more forward in position, 0.504 mm. \times 0.596 mm. and right one 0.532 mm. \times 0.633 mm. Cirrus sac long and tubular, highly twisted, looping in an irregular course, extending beyond

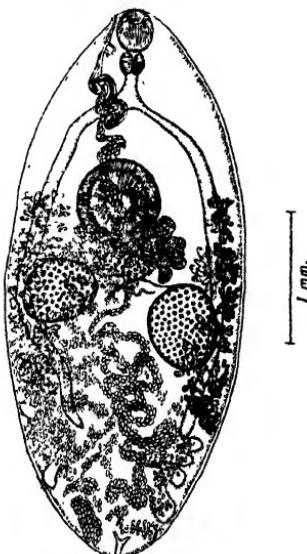


Fig. 1. *Prosthogonimus querquedulae* Yamaguti, 1933, dorsal view.

¹ The writer wishes to acknowledge her gratitude to Dr. H. T. Chen for his many helpful suggestions and criticisms.

intestinal bifurcation, passing outward and forward to genital pore on left side of oral sucker.

Ovary deeply lobed like a cluster of grapes immediately behind and to right of ventral sucker. Laurer's canal present, shell gland behind and to left of ovary. Vitellaria symmetrical, beginning about the level of middle of ventral sucker, reaching the region behind testes but not behind intestinal caeca, and overlapping intestinal caeca and part of each testis. Uterus twisting and occupying all spaces behind testes, then passing forward between ovary and left testis crossing the acetabulum dorsally and anteriorly to the genital pore. Eggs oval, measuring $12.63-14.74\mu \times 21.05-25.26\mu$.

Excretory bladder Y-shaped, unbranched stem very short, excretory pore terminal.

Location.—Rectum.

Discussion.—The excretory pore of the present specimen appears to be terminal, while in Yamaguti's specimen it is 0.17 mm. from the posterior extremity on the dorsal side. The apparent difference

may likely be due to differences in the methods of mounting the specimens. Vitellaria in the present specimen are more symmetrical and more nearly equal in size than in that of Yamaguti. The uterus is also more well developed occupying all spaces in the posterior part and partly overlapping vitellaria on the left side. Apparently our specimen is more mature than Yamaguti's.

***Philophthalmus oculatae* n. sp. (fig. 2)**

Specific Diagnosis.—A single specimen was found. Body elongated, 3.30 mm. in length by 0.94 mm. in maximum width at posterior fourth, with two ends of the body about the same size. Cuticle smooth. Oral sucker 0.367 mm. wide \times 0.231 mm. long. Ventral sucker situated on anterior third of body, 0.368 mm. wide \times 0.473 mm. long. Prepharynx not seen, pharynx large, measuring 0.295 mm. \times 0.252 mm. Oesophagus wide, 0.252 mm. in length, intestinal caeca reaching posterior end of body.

Testes oval, smooth, equal in size, situated obliquely and immediately one behind another, measuring 0.179 mm. \times 0.143 mm. Cirrus sac long, extending beyond ventral sucker, measuring 0.863 mm. \times 0.126 mm., the maximum width being near posterior end. Genital pore on the mid-ventral line of oesophagus.

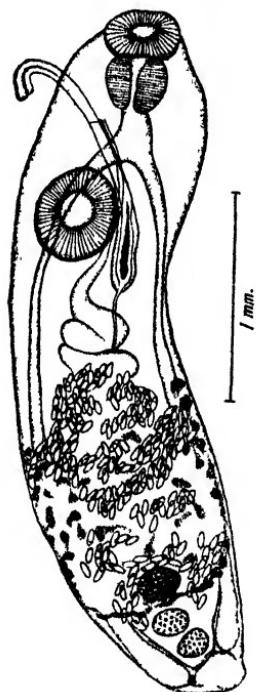


Fig. 2. *Philophthalmus oculatae* n. sp., ventral view.

Ovary lies immediately in front of anterior testis, oval and smooth, 0.190 mm. \times 0.142 mm. Uterus well developed, occupying most of the space between testes and ventral sucker, extending laterally to margin of the body overlapping intestinal ceaca at about the middle of body. Vitellaria begin at middle between ventral sucker and ovary, passing backward to level of ovary. They are tubular outside of intestine, and are in the form of scattered follicles inside. Vitelline ducts meet behind ovary. Eggs in mounted specimens measure 78.5 μ \times 35.7 μ .

Discussion.—The present species somewhat resembles *P. problematicus* in that the sex glands of the latter are almost equal in size and that its eggs are about the same size as the present species, but differs by having the cirrus sac of the present species extending beyond the ventral sucker. It can also be distinguished from all species previously described in this genus in the presence of both the tubular and follicular vitellaria.

Specimen.—A single specimen.

Location.—In orbital cavity, attached to the anterior corner of lower eyelid.

Type Specimen.—Department of Biology, Lingnan University.

Leucochloridium muscularae n. sp. (fig. 3)

Specific Diagnosis.—Body oval, very muscular, cuticle smooth. Measurements of two specimens give 1.073 mm. wide \times 2.009 mm. long and 1.110 mm. wide \times 1.954 mm. long, respectively. Suckers well developed, oral sucker subterminal, 0.440 mm. \times 0.569 mm. and 0.449 mm. \times 0.495 mm., ventral sucker round, 0.504 mm. and 0.490 mm. Prepharynx not seen. Pharynx very muscular, 0.165 mm. \times 0.225 mm. Oesophagus very short, intestinal ceaca not quite reaching posterior end of body, ending a little behind the anterior testis or at posterior level of posterior testis.

Testes entire, slightly elongated, behind ventral sucker, one obliquely after another on each side. Measurements are taken from both specimens: anterior testis 0.280 mm. \times 0.232 mm. and 0.263 mm. \times 0.211 mm.; posterior testis 0.297 mm. \times 0.253 mm. and 0.221 mm. \times 0.200 mm. Extremity, 0.288 mm. \times 0.311 mm. in one of the specimens, cirrus

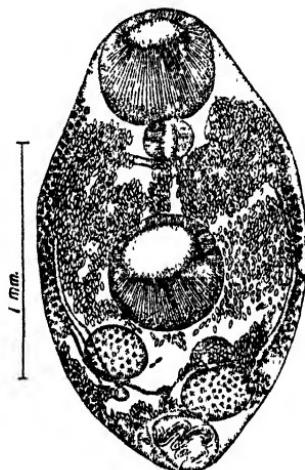


Fig. 3. *Leucochloridium muscularae* n. sp., ventral view.

Cirrus sac large, at posterior extremity, 0.288 mm. \times 0.311 mm. in one of the specimens, cirrus

long, making loopings inside the cirrus sac. Genital opening at posterior end, terminal.

Ovary entire, transversely elongated, immediately in front of posterior testis 0.152 mm. \times 0.122 mm. and 0.189 mm. \times 0.126 mm., respectively. Uterus occupying most of the space between posterior margin of oral and ventral suckers, extending laterally over the intestinal caeca, and making a few loops between the sex glands. Vitellaria well developed, beginning at posterior level of oral sucker and extending backward along both sides of body and partly covering intestinal caeca ventrally, ending about the posterior level of the posterior testis. Eggs oval, measuring 28 μ \times 18 μ .

Discussion.—This species resembles *L. pricei* McIntosh, 1932, but differs from it in the following aspects: the oral sucker, the ventral sucker and the pharynx are distinctly larger than those of *L. pricei*; the ovary is oval and is situated to one side, while that of *L. pricei* is round, much smaller, and is situated near the median line, both of the testes are twice the size of those of *L. pricei*, and the cirrus sac is more than twice as long as that of *L. pricei*.

Specimens.—Two specimens were collected.

Location.—Rectum.

Type Specimens.—Department of Biology, Lingnan University.

***Leucochloridium passeri* n. sp. (fig. 4)**

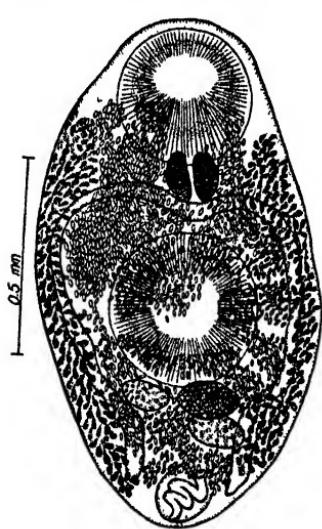


Fig. 4. *Leucochloridium passeri* n. sp., ventral view.

Specific Diagnosis.—Body oval, cuticle smooth, two mounted specimens, 1.284 mm. long \times 0.734 mm. wide and 1.116 mm. long \times 0.638 mm. wide, respectively. Sucker very large, oral sucker slightly subterminal, 0.367 mm. \times 0.349 mm., ventral sucker at about middle of body, round, 0.389 mm. in diameter in the larger specimen. Prepharynx not seen, pharynx 0.147 mm. \times 0.126 mm., oesophagus very short. Intestinal caeca slightly arching forward immediately after branching, passing backward and outward on both sides, and then turning gradually inward at about the anterior level of ventral sucker but making a characteristic sharp turn behind ovary and anterior testis, finally re-extending straight backward to the region of the cirrus sac.

Testes oval, entire, one obliquely behind another, anterior testis at about the same level as ovary, posterior testis immediately behind or

partly overlapping ovary. From the larger mounted specimen, anterior testis measured 0.120 mm. \times 0.078 mm., posterior testis 0.158 mm. \times 0.095 mm. The ovary is oval and entire, 0.168 mm. \times 0.118 mm. Due to the densely crowded eggs, the sex glands in the smaller mounted specimen are difficult to make out. From a specimen cut at sagittal sections, the anterior testis measured 0.168 mm. \times 0.095 mm., posterior testis 0.152 mm. \times 0.105 mm., ovary slightly larger than testes, in both cases being 0.181 mm. \times 0.105 mm. Cirrus sac large, at posterior end, and measuring 0.169 mm. \times 0.211 mm. from sagittal section, genital opening at posterior end, and somewhat dorsally shifted, cirrus long, looping inside the cirrus sac.

Vitellaria well developed and consisting of large, closely packed follicles which extend laterally from the posterior third of the oral sucker to the tip of the caeca. Uterus extending from middle of oral sucker to posterior end, twisted and full of eggs, occupying most of the spaces of the body, thus making the study of mounted specimens very difficult. Eggs oval 20-24 μ \times 14-15 μ (from 10 eggs).

Excretory bladder tubular, Y-shaped, 0.105 mm. long, opening dorsally and immediately in front of the genital opening at posterior end.

Discussion.—The present species is somewhat similar to *L. actitis* McIntosh, 1932, and *L. variae* McIntosh, 1932, but can be distinguished from them in having the sex glands definitely oval and close together, the sex glands of the other two species being more or less spherical with the anterior testis farther away from the ovary, at a distance more than half the diameter of the latter; and in having the oral sucker slightly smaller than the ventral sucker. It also differs from *L. actitis* in having much smaller testes, and from *L. variae* in having the width of the pharynx smaller than the greatest diameter of the ovary.

References

MCINTOSH, A.

- 1927. Notes on the genus *Leucochloridium* Carus (Trematoda). *Parasitol.* 19 (3) :353-364.
- 1932. Some new species of trematode worms of the genus *Leucochloridium* Carus, parasitic in birds from northern Michigan, with a key and notes on other species of the genus. *Jour. Parasitol.* 19 (1) :32-53.

TSENG SHEN.

- 1932. Douve trouvée dans un oeuf de poule à Nankin et considerations sur les espèces du genre *Prosthogonimus*. *Bull. Soc. Zool. France* 56 (5) :468-478.

TUBANGUI, M. A.

- 1932. Trematode parasites of Philippine vertebrates, V. Flukes from birds. *Phil. Jour. Sci.* 47 (3) :369-404.

YAMAGUTI, S.

1932. Studies on helminth fauna of Japan. Part I. Trematodes of birds, reptiles and mammals. *Jap. Jour. Zool.* 5(1) :1-134.
1934. Studies on the helminth fauna of Japan. Part 3. Avian trematodes, II. *Jap. Jour. Zool.* 5(4) :543-583.
1935. Studies on the helminth fauna of Japan. Part 5. Trematodes of birds, III. *Jap. Jour. Zool.* 6(2) :160-182.

廣州麻雀之寄生蛭及其三新種

吳亮如著

嶺南大學生物學系**(摘要)**

麻雀體內之寄生蛭，本文現描述其四種：*Prosthogonimus querquedulae* 經於民國二十二年由 Yamaguti 氏發表，此外三種為 *Philophthalmus ocellarae* (新)，*Leucochloridium muscularae* (新)，及 *Leucochloridium passerri* (新)，均未經發表者。*Philophthalmus ocellarae* 僅一單蛭得自下眼蓋，後二者則自大腸。

**A NEW SPECIES OF PHARYNGODON (NEMATODA: OXYURIDAE)
FROM CANTON LIZARD, GEKKO GECKO, WITH REMARKS
ON THE EVOLUTION OF THE GROUP¹**

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Pharyngodon apapillosum n. sp. (fig. 1-8)

Diagnosis of Pharyngodon.—Lateral alae well-developed in male, absent in female. Caudal alae, spicules and caudal papillae all absent. Tail in both sexes tapering and subulate, nearly one-third as long as body. Male tail with three cuticular spines on subulate portion; female tail with numerous spines. Vulva a little behind oesophageal bulb. Uterine branches parallel. Eggs spindle-shaped, with a cuticular plug at each pole, not segmented when laid.

TABLE 1

Measurements, in Millimeters, of Pharyngodon apapillosum

	NUMBER OF SPECIMENS MEASURED	
	2 MALES	4 FEMALES
Length	1.365-1.490	3.721-4.770
Maximum width (excluding alae) . . .	0.097-0.109	0.275-0.284
Width of lateral ala	0.020-0.021	
Distance from head to nerve ring	0.083	0.120
Distance from head to excretory pore. . .	0.344-0.368	0.580-0.668
Distance from head to vulva		0.661-0.765
Length of oesophagus, including bulb.....	0.234-0.250	0.550-0.603
Width of oesophagus	0.020	0.045-0.048
Size of oesophageal bulb	0.051-0.053	0.113-0.117
	by	by
	0.053	0.121-0.126
Length of tail	0.530-0.535	0.962-1.013
Length of subulate portion of tail	0.440	0.800-0.851
Distance of transverse striations	0.0058-0.006	0.0092-0.011
Size of eggs		0.113-0.146
	by	
	0.034-0.037	

Diagnosis of Species.—Males much smaller than females and also much fewer in number in occurrence. Body of both sexes coarsely striated, striations farther apart toward posterior end. Lips not

¹This is the first instalment of a thesis submitted to the Graduate Institute of Natural Sciences, Lingnan University, for the partial fulfillment of the requirements for the degree of Master of Science. The work was done under the direction of Dr. H. T. Chen.

apparent. A very short buccal capsule present. Oesophagus distinctly constricted before bulb, which contains a well-developed vulvar apparatus. Nerve ring at anterior part of oesophagus. Excretory pore behind oesophageal bulb, sometimes slightly anterior. Lateral alae present only in male. Tail very long, filamentous, with cuticular spines.

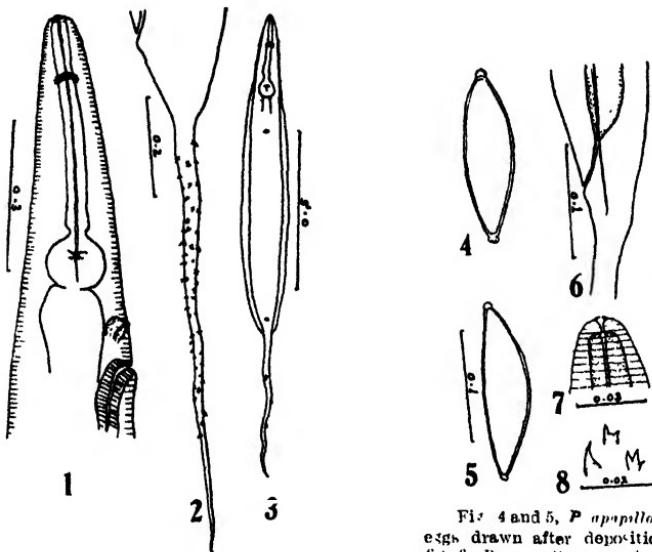


FIG. 1, *Phaenoodon apapillatus* n. sp., anterior portion of female, lateral view; fig. 2, *P. apapillatus*, posterior portion of female, lateral view; fig. 3, *P. apapillatus*, male, ventral view.

Male.—Very minute but rather stout in appearance. Body gradually tapering toward both ends, posterior end being followed by a filiform tail, about one-third as long as whole body length. Transverse striations very coarse, farther apart toward posterior end, but absent on subulate portion of tail. Lateral alae well-developed, extending from oesophageal region to a little behind cloaca, widest at middle of body and diminishing rapidly toward anterior end.

Oesophagus one-sixth as long as body, with a very short buccal cavity and a posterior globular bulb. A distinct constriction present just before commencement of bulb. Excretory pore conspicuous, 0.110-0.118 mm. posterior to oesophageal bulb.

No caudal alae around cloaca, and no caudal papillae of any kind. Spicule absent. Three sharp-pointed cuticular spines on subulate portion of tail, occurring more or less at definite intervals.

FIG. 4 and 5, *P. apapillatus*, eggs drawn after deposition; fig. 6, *P. apapillatus*, posterior portion of male, lateral view; fig. 7, *P. apapillatus*, anterior extremity of male; fig. 8, *P. apapillatus*, cuticular spines of female tail.

Tail not truncated on ventral side, but tapering gradually into a long process.

Female.—Body coarsely striated. Excretory pore generally post-oesophageal, sometimes reaching as high up as level of oesophageal bulb. Vulva prominent, a little distance behind excretory pore. Vagina long, running backward, followed by an undivided portion of uterus and then two parallel uterine branches which run back and forth around intestine. Eggs characteristically spindle-shaped, usually more convex on one side than on the other, with an outer cuticular plug at each end. Eggs not segmented in uterus, dividing soon after deposition.

Oesophageal bulb sub-globular, a little wider than long. Oesophagus one-sixth to one-seventh as long as body.

Tail very long, about one-fourth as long as body, tapering gradually behind anus for some distance and then emerging into a long subulate process. Subulate process heavily cuticularized and bearing numerous cuticular spines, extending from proximal end to a little distance before distal extremity. Spines apparently in rows, but their definite arrangement could not be made out. Number of spines too numerous for an accurate count; 70-90 appears to be the right range, and in one specimen 76 were counted after very careful and tedious manipulation. Shape of spines variable: single-spined, 2-spined and 3-spined, the first type predominating, the last type relatively rare.

Host.—*Gekko gecko*. (L.)²

Location.—Junction between small intestine and rectum; rectum.

Locality.—Canton market.³

Intensity of Infection.—Fifty-two and 181 individuals were recovered from the two hosts, respectively.

Incidence of Infection.—Both hosts examined were positive.

Dates Collected—Oct. 8, 1936; Oct. 21, 1936.

Types.—Department of Biology, Lingnan University, Canton.

Discussion.—A key and a table have been given by Spaul (1926), containing all the species of the genus *Pharyngodon* up to date. Species are segregated into two large groups, those with the posterior pair of caudal papillae enclosed within the caudal alae and those with the posterior pair of caudal papillae not enclosed within the caudal alae. Since then four species have been added; namely, *Pharyngodon batrachiensis* Walton, 1929, *P. tiliquae* Baylis, 1930,

² Two specimens of intestinal tracts of *Gekko gecko* were given me by Mr. Ip-Kwong Shum (岑耀光) of the Biology Department, to whom I am very grateful.

³ The hosts are consumed locally for medicinal purposes and are commonly found on the market for sale. They are said to come from Kwangsi Province

P. warneri Harwood, 1932, and *P. armatus* Walton, 1933. Both Walton's species are described from American frogs and are based on female specimens only. While resembling females of *Pharyngodon* in general, Walton's species possess certain characters that are not found in other members of the genus, notably the unusual posterior position of the excretory pore and of the vulva. The decision of their exact systematic position may have to be postponed until the discovery of male specimens. The other two species, *P. tiliqueae* and *P. warneri*, both belong to the group in which the posterior pair of caudal papillae are enclosed within the caudal alae.

The present species does not belong to either of the above mentioned groups. It is very characteristic in possessing the following distinguishing features: the total reduction of the caudal alae, the entire absence of the caudal papillae, and the unusual length of the tail in both sexes. The first and the last characters suggest a relationship of this species to *Pharyngodon megalocerca* (Skrjabin), 1916, but from the latter the present species can be easily distinguished by the presence of spines on the tail and by the fact that the tail of the male is not provided with lateral alae, and finally by the entire absence of any caudal papillae.

Some Remarks on the Evolution of "Pharyngodonidae"

Travassos (1920) established the family Pharyngodonidae in which were included three genera: *Pharyngodon*, *Thelandros*, and *Tachygonetria*. This family has apparently not been accepted by many authors. While following Yorke and Maplestone (1926) in putting the genus *Pharyngodon* under the family Oxyuridae, I am inclined to think that there are some merits in Travassos's family, particularly in consideration of the evolution of the genera included or presumably included in this "family." Besides the three genera mentioned above, there are two more, namely, *Parathelandros* Baylis, 1930, and *Parapharyngodon* Chatterji, all being closely related. The latter is not much different from the old genus *Thelandros* and Baylis has considered it as a synonym. Baylis's genus, *Parathelandros*, is closely related to *Thelandros* and can, therefore, be included in Travassos's Pharyngodonidae. So there is a total of four well established genera in this group.

Thapar (1925) has considered the phylogeny of the oxyurids of reptiles in great detail and the present discussion is along the same line of thought but to a different extent. The evolution of the forms of this group appears to be regressive because of the fact that there is a tendency toward the degeneration of the papillae and the alae as the organisms in the group become more specialized, and that ovoviparity, which is regarded as a higher type of development, is exhibited by several species of the genus *Tachygonetria*. Starting with the genus *Pharyngodon*, which is supposed to be very primitive although very complex in structure, we can see that in some species, broad caudal alae and three pairs of strong, pedunculated papillae

all enclosed within the alae are present, and in other species of the same genus, the caudal papillae are situated outside of the alae, and in still others (*P. luevicauda* (Seurat) 1914 *P. megalocerca* (Skrjabin) 1916) both caudal alae and caudal papillae are very much reduced in size. Then, in *Thelandros* the caudal alae are totally reduced, and one pair of the caudal papillae becomes sessile. Then again in *Tachygometria* both lateral and caudal alae are absent and all the papillae are sessile. Then again in *Parathelandros* further degeneration appears so that not only caudal alae are absent but also the caudal papillae become reduced to two pairs only, which are small and inconspicuous. The final step of degeneration is seen in *Pharyngodon apapillosum* n. sp. in which both the caudal alae and caudal papillae are absent.

It is worth while to note in this connection that *Pharyngodon apapillosum*, differing from all other members of the genus, comes at the end of the evolutionary series. It constitutes the only exception to the present evolutionary change, but as more evidence accumulates on the evolution of this group, a new genus may have to be erected in the future for the reception of this interesting form.

References

BAYLIS, H. A.

1923. Report on a collection of parasitic nematodes, mainly from Egypt. Part II. Oxyuridae. *Parasitol.* 15:14-23, 3 fig.

1930. Some Heterakidae and Oxyuridae (Nematoda) from Queensland. *Ann. & Mag. Nat. Hist.*, 10th ser., 5:354-366.

1936. The fauna of British India, including Ceylon and Burma. Nematoda. Vol. I. Ascaroidea and Strongyoidea. xxxvi & 408 p., 182 text-fig. Taylor and Francis, London.

CHATTERJI, R. C.

1933. On a new nematode, *Parapharyngodon maplastoni* gen. nov., sp. nov. from a Burnese lizard. *Ann. Trop. Med. Parasitol.* 27: 131-134, 5 fig.

HARWOOD, P. D.

1932. The helminths parasitic in the Amphibia and Reptilia of Houston, Texas, and vicinity. *Proc. U. S. Nat. Mus.* 81(17).1-71, 5 pl.

HSÜ, H. F. AND HOEPLI, R.

1933. On some parasitic nematodes collected in Amoy. *Peking Nat. Hist. Bull.* 8:155-168, 4 pl.

SEURAT, L. G.

1914. Sur un nouvel Oxyure des Reptiles. *C. R. Soc. Biol.* 77:96-98, 4 text-fig.

SKRJABIN, K. I.

1916. Parasitic trematodes and nematodes collected by the expedition of Prof. V. Dogiel and I. Sokolov in British East Africa. (No. 4) Russian, p. 1-98. English translation, p. 99-157, pl. I-Y.

SPAUL, E. A.

1926. On a new species of the nematode genus *Pharyngodon*. *Ann. & Mag. Nat. Hist.*, 9th ser., 17:585-591.

THAPAR, G. S.

1925. Studies on the Oxyurid parasites of reptiles. *Jour. Helminth.* 3 : 83-150, 132 fig.

TRAVASSOS, L.

1920. Esboco du uma chave geral dos Nematodes Parasites. *Refist. vet. et Zootech., Rio de Jan.*, p. 59-70.

WALTON, A. C.

1929 Studies on some nematodes of North American frogs, I. *Jour. Parasitol.* 15 :227-240, 43 fig.

1933. Two new nematodes, and notes on new findings of nematodes parasitic in Amphibia. *Proc U. S. Nat. Mus.* 82(6) :1-5, 1 fig.

1933a. The Nematoda as parasites of Amphibia. *Jour. Parasitol.* 20 :1-32, 4 fig.

YORKE, W. AND MAPLESTONEE, P. A.

1926 The nematode parasites of vertebrates. xii & 536 p., 307 fig.. Philadelphia, U.S.A.

廣州蜥蜴腸內寄生圓蟲之一新種
及本蟲類之演化觀

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(摘要)

廣州市上出售一種蜥蜴 (*Gekko gecko*), 其直腸中有寄生圓蟲甚多, 此蟲經作者詳細研究之結果, 認爲係一新種。定名為 *Pharyngodon apapillosum*, 屬 Oxyuridae 科。

Pharyngodon 屬所含之種向分為二大類。其一後尾凸在尾翼範圍內, 其二後尾凸不在尾翼範圍內。而本新種則尾凸尾翼俱付缺如, 其他尚有特徵甚多, 故定為新種。

Pharyngodon 一屬以外, 尚有其他三屬, 同隸于 Travassos 氏所建用之 Pharyngodonidae 科內。其各種間之演化情形係減退的, 可根據雄蟲尾翼尾凸之發育程度而尋之。

**LYCHEE FRUITS DESTROYED BY DEUDORIX EPIJARBAS
MOORE (LEPIDOPTERA: LYCAENIDAE)¹**

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On April 16 this year, Mr. I. N. Shiu, Professor of Horticulture of the College of Agriculture, pointed out to me an infestation occurring in Lychee fruit. The infestation was in an orchard near the north gate of Lingnan University campus, affecting a number of potted Lychee plants (*Litchi chinensis* Sonn.) which were bearing flowers and fruit. Some of the fruits were 14 mm. long and 7 mm. in greatest diameter, some were a little larger. Most of the young fruits were infested by caterpillars which stayed inside of the fruit. Injury was shown by a hole where the borer entered, the size of the hole varying with the size of the borer. No matter how small, the hole was very conspicuous due to the small cylindrical reddish-brown feces hanging outside it on the fruit. In appearance these feces were similar to those of the larvae of longhorn borers. After careful observation I noticed that there were one or two empty egg shells on the calyx or pedicel or the lower part of each injured fruit. I thought that these shells might be the eggs from which the borers had hatched.

On the morning of April 19, I found three unhatched eggs on three fruits and also caught a Lycaenid adult on a Lychee flower cluster. The adult, a female, was brought back to the laboratory and kept in a glass jar in which were placed some clusters of Lychee flowers and some twigs containing fruit. About thirty minutes after she was put into the jar, she fed on nectar in the flowers for three minutes and moved about on the fruit. After another nine minutes she bent over the posterior part of her abdomen and tested the young fruit by pressing with the ovipositor. She tested one fruit after another several times, then laid one egg. After depositing this egg she stayed quietly on the fruit and rested for a few minutes, then walked to another fruit nearby, tested it as before and laid another egg. After she had laid one to three eggs she came back to the flower clusters to suck nectar. From the morning of April 19 to the morning of April 22 she had laid a total of 69 eggs. The eggs she laid appeared the same as the empty egg shells and the three unhatched eggs that I had found on injured fruits.

¹ Contribution from the Lingnan Natural History Survey and Museum. The writer is indebted to Miss Y. C. Ng for the identification of the butterfly, to Professor W. E. Hoffmann for suggesting some changes in this paper, and to Miss F. C. Wells for correcting the English.

The Egg.—The egg (pl. 12, fig. 5) is somewhat spherical with a flattened bottom and a small depressed round area at the center on the top. It is about 0.817 mm. in diameter and 0.544 mm. in height. Its surface is sculptured with polygonal areas or cells, of irregular size and form, which have very spiny edges. The eggs are deposited singly on the calyx, the pedicel, or on the basal part of the fruit. It is rare to find more than two eggs on one fruit. The newly laid egg is colorless. After four or five minutes it changes to pale white. Later on it changes to light greenish-gray, then to pinkish-gray. When it is nearly ready to hatch, it changes to dark gray. The incubation period was 5 to 6 days for eggs laid April 19 and 20. The hatching process lasted about one hour. The caterpillar took more than fifty minutes to cut the egg shell open at the center of the top but spent only four or five minutes crawling out of the egg shell. Of the eggs laid on April 19 and 20, 100% hatched and of those laid on April 20 and 21, 93%.

The Caterpillar.—On the morning of April 20 one of the three eggs collected in the field on April 19 hatched. The larva (pl. 12, fig. 5) had crawled to the middle of the fruit and eaten off a little of the skin but had not yet bored into the fruit. It was so tiny that it could hardly be seen by the unaided eye, being only about 1 mm. long. I was helped to locate it by the small grains of reddish-brown feces. Under a binocular microscope, the top of its head appeared dark brown, the clypeus flesh red and the labrum as well as the labium reddish-brown, the mandibles almost black. In the center of the dorsal surface of the prothorax there was a deep brown transverse marking, notched in the center of the anterior margin, accompanied by a number of long white hairs. The whole body was more or less round and covered with short white hairs except the last segment which was flattened instead of cylindrical and had a very dark brown dorsal surface. On this surface there were two brownish-yellow spots and the hairs were short and black while around its outside margin the hairs were long and white. The young caterpillar took about 40 minutes to bore into the fruit. It fed mostly on the seed inside of the fruit but not very much on the skin except to cut an entry. After eating all the seed of one fruit a larva may come out and bore into another fruit. Because most of its life is spent inside of the fruit, it is not easy to determine the number of larval molts. However, the total larval period was about 16 to 19 days for those individuals which hatched during the third week of April. The full-grown caterpillar is about 19 mm. long and 8 mm. wide across the first abdominal segment. The width of the prothorax and the last abdominal segment is the same, namely, 5 mm. The body is covered with very uniform short dark brown hairs on the dorsal surface. There are masses of long white hairs along sides, beneath the spiracles, and on each segment. The head is brown and dark brown mottled; the prothorax yellowish-brown with black markings;

the mesothorax yellowish-brown. The metathorax and the first and sixth abdominal segments are dark brown; the last abdominal segment, reddish-brown; the rest of the body, greenish-brown. On each segment there are five depressed areas arranged in a transverse row which is about an equal distance from the anterior and posterior margins of the segment. The dark brown marking in the center of the dorsal surface of the prothorax is diamond-shaped, wider than long, with a very thin longitudinal median pale line. The posterior end of the caterpillar is truncate.

The Chrysalid.—The chrysalid (pl. 12 fig. 4, 5) is coffee brown mixed with blackish and is covered with short yellowish-brown hairs. It is 15 mm. long, 6 mm. wide, and 5 mm. thick. The ends are broadly rounded. The shape and color make the chrysalid greatly resemble the pupa of a moth. At the anterior end, on each side, there is a black marking joined anteriorly by a narrow reddish-yellow ridge, giving the appearance of an eye and eyebrow. The caterpillars leave the fruit and hide under leaves or other objects on or above the soil for pupation. The chrysalid is attached to the object of support by some silk spread on the surface and also by a brownish-yellow thread looped around the middle of the body. The prepupal stage is about three days, the actual pupal stage about 10 or 11 days.

The Adult.—The adults, of course, do no harm to the Lychee tree. They may suck nectar from the flower clusters but this does not cause injury to any part of the plant. The male (pl. 12, fig. 1, 2) is a little smaller than the female. The female (pl. 12, fig. 3) is about 15 mm. long from the head to the tip of the abdomen; the wing expanse is 39 mm. The male is about 14 mm. long, with a wing expanse of 32.5 mm. The adults also differ in coloration. In the male, on the upper surface of each fore wing there is red in the center but the costal margin, the cell, outer margin, and a portion near the inner margin are blackish-brown, while the upper surface of the hind wings is entirely red with the basal costal margin dark brown. On the hind wing, from the outer margin at the end of the first anal vein, projects a narrow black white-tipped tail and at its posterior angle there is a lobe with a black center surrounded by red, then black, circles. On the under surface this lobe is entirely black and in both the fore and hind wings the under surface is grayish-brown with indistinct transverse bands along the postdiscal area and outer margins. Besides these bands near the outer margin, on the under surface of each hind wing there is a black spot, surrounded by yellowish-brown, between Cu₂ and 1st A. Near this spot, the spaces between the 1stA and 2dA and also between the 2dA and 3dA have a shining metallic bluish tint. The thorax is reddish-brown, covered with brown pubescence. The abdomen is reddish on the dorsal surface and yellowish on the ventral surface. The female is rather dull grayish-brown on the upper surface of both the fore and hind wings

as well as on the dorsal side of the body. The tails and the lobes are almost the same in appearance as those of the male, and the markings on the under surfaces of the wings are a little lighter, but otherwise not very different from those of the male. The antennae of both male and female are black spotted with white, with reddish-brown at the tip of each knob. The compound eyes are brown, but the area between them and caudad of them and also the labial palpi are largely white. In the laboratory the longevity of both sexes was about 4 to 5 days. During this period they were given water but had no opportunity to feed.

Host Plant.—The lychee is the only host of this species so far as our field experience goes. Since there is another species of Lycaenid on the campus which feeds inside the flower buds of *Gardinia*, I gave some *Gardinia* flower buds to the larvae. The larvae fed on these buds but did not grow as well as when they were fed with Lychee fruits. Mr. David T. Fullaway, in his paper "Notes on Litchee Insects" (*Ling. Agri. Rev.* 4(2):173, 1927), said, "The fruit is entered when quite small and much of it falls to the ground in an immature condition." I found that the large fruits were infested as much as the small ones. The infestation is very serious. On one branch of a large tree, growing near the potted plants I have mentioned, 11 out of 18 fruits were infested. As the larvae grow they usually leave the small fruits and bore into larger ones. If a small larva leaves a very young fruit after having made only a little tunnel, the fruit usually does not drop but may gradually seal up the entry of the tunnel and grow to maturity. In many cases though the borer was quite large and the seed of the fruit was entirely eaten, only the skin of the fruit remaining on the tree. Usually the skin did not drop but continued to grow for quite a long time, remaining green the while, before gradually changing to brown and shrinking. Some immature fruits had fallen off the tree but we could not be sure whether the fall was due to infestation of the borers or to some cultural conditions, because some of the immature fruits picked up from the ground had been infested and some had not. However, this borer is a very serious pest.

Natural Enemies.—In order to drop the feces outside of the tunnel the borer usually has its posterior end flush with the surface of the fruit and in this manner exposes itself to the attack of enemies. While on a field trip on April 19 I noticed a larva of a lace-wing fly killing a borer by sucking the body juices from the posterior end. It sucked the borer completely dry, only the skin being left. The lace-wing larva was taken to the laboratory where it was placed in a glass container with a Lycaenid larva which was 9 mm. in length. The lace-wing larva searched for three or four minutes on the fruit containing the caterpillar. When it discovered the entrance to the tunnel it pierced the posterior end of the caterpillar with its sharp, curved, forceps-like mandibles, and slowly

sucked all of the caterpillar's body fluid. It took about seventeen minutes to accomplish this task. The lace-wing made its cocoon on April 21 and the adult emerged on April 30. The adult is green and is about 10 mm. in length with a wing expanse of about 25 mm. This green lace-wing fly is of the trash-carrying type and is probably the same species recorded by Professor Hoffmann as feeding on the leaf-mining larvae of the Red and Black Citrus Leaf Miner, *Throscoryssa citri* Maulik, and on the slimy surface-feeding larvae of the Green Citrus Flea Beetle. The stages of this lace-wing were described and figured (see Hoffmann: The Life History, Economic Status, and Control of Three Injurious Leaf Beetles (Coleoptera: Chrysomelidae). *Ling. Sci. Jour.* 14(3):505-517, 7 pl., 1935).

爲害荔枝果實之小灰蝶 *Deudorix epijarbas* Moore

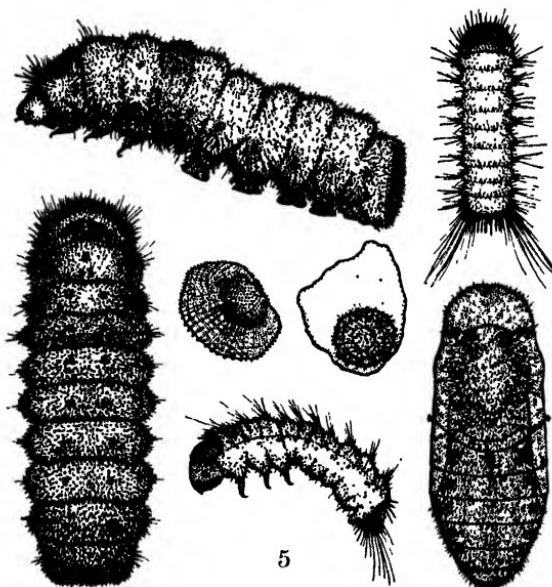
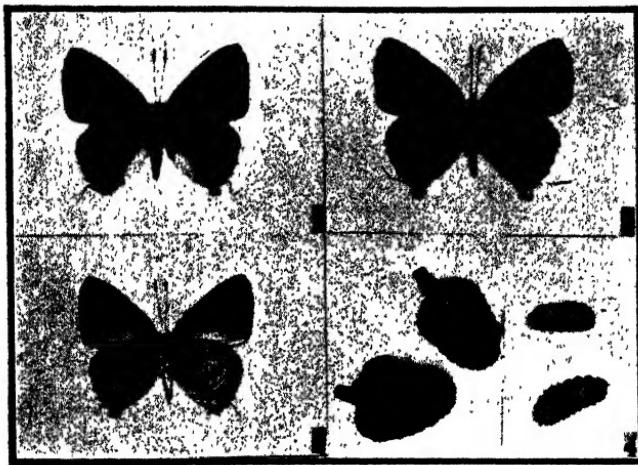
(鱗翅目；小灰蝶科)

周郁文著

嶺南大學自然博物採集所技佐

(摘要)

在廣州嶺南大學果園中，小灰蝶 *Deudorix epijarbas* Moore，爲害荔枝甚大；幼蟲蛀食荔枝果實，每頭常侵害數果。本文記載其生活史，對於各期，除詳細描述外，並加插圖。每雌蟲產卵，約在六十九粒以上。在四月間，卵期約需五至六日，幼蟲期約需十六至十九日，前蛹期約三日，蛹期則需十至十一日。



Deudorix epitarbas Moore

Fig. 1, male, dorsal view; fig. 2, male, ventral view; fig. 3, female, dorsal view; fig. 4, dorsal aspect of pupa and larva, fruit showing entrance hole, and fruit (lower figure) showing entrance hole surrounded by a large discolored area (the beginning of decay). Fig. 5 : upper right and lower center, dorsal and lateral aspects of the newly hatched larva; upper left and lower left, lateral and dorsal aspects of the mature caterpillar; lower right, dorsal aspect of the chrysalid; center, eggs—the figure on right showing the egg on a portion of fruit, the figure on left showing the empty shell and the exit hole. The drawings are by Mr. T. W. Lo.

**LIFE HISTORY STUDIES IN NINE FAMILIES OF KWANGTUNG
BUTTERFLIES (LEPIDOPTERA: RHOPALOCERA)**

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(Continued from *Lingnan Science Journal*, Vol. 17, No. 2, p. 245.)

VI. PAPILIONIDAE

1. *Papilio agamemnon* Linnaeus, 1758 (pl. 13, fig. 1, 2, 3)

Papilio agamemnon Linn., Syst. Nat. ed. X, 1758, p. 462.

Caterpillars of various sizes were collected in June, medium-sized caterpillars during the first ten days of May and also the first week of November, and nearly full-grown caterpillars during the last week of April. The caterpillars feed on the Soursop, *Anona muricata*, *Michelia alba* DC., *Desmos cochinchinensis* Lour., *Artabotrys uncinatus* (Linn.) Merr., *Michelia figo* (Lour.) DC., and *Diospyros* sp. Pupation took place during the last twenty days of May, the last 2 weeks of June, the last ten days of October, and about the middle of November. The adults emerged early in March, the first and third weeks of April, the last week of May, the last ten days of June, and the first week and last ten days of July. In May the duration of the pupal stage varies from 12 to 19 days. In the months of June and July, the second last stadium is 2 or 3 days (average 2.40); next to the last stadium 2 to 11 days (average 5.59); and the duration of the pupal stage varies from 5 to 14 days (10.65 days as the average). From the last week of October to the last two weeks of April the last stadium requires about 15 days, while the pupal stage lasts about 160 days.

Butterflies of this species were collected on Honam Island, Canton, March 7, 1922, and Swatow, Aug. 25, 1934, Kwangtung Province. One specimen was also found in Kwangsi Province, Aug. 2 to 3, 1934.

These caterpillars are characterized by having the body increasing in thickness rapidly to the metathorax and first abdominal segment, and then tapering gradually toward to the posterior end. The first instar caterpillars measure from 2.5 to 5.5 mm. The general color is brownish-black with the dorsum of the mesothorax and metathorax pale, and the posterior end nearly white. The dorsum of the prothorax is much darker. Minute hairs are found on prothorax, mesothorax, metathorax and on the posterior extremity. The spinous projections are found on the subdorsal spines of the above-mentioned

areas. Small hairs of the body are arranged in longitudinal rows. The second instar caterpillars measure from 5.5 mm. to 8.4 mm. The ground color of the body is smoky black, with the dorsum of the abdominal segments 5, 6, and 7 yellow. The head and three pairs of subdorsal thoracic spines, which possess spinous projections, are brown. The caudal subdorsal spines are pale, almost white. The venter is also pale. The head and body bear numerous small hairs. The third instar caterpillars measure from 8.4 to 13.5 mm. The ground color is smoky brown tinged with green—usually small dark green markings are present. The dorsum of the abdominal segments 5, 6, and 7 is greenish-yellow, shortly before molting the above mentioned greenish-yellow area is inconspicuous. The caudal and subdorsal spines are yellowish-white, with bluish-black at tips. The fourth instar caterpillars measure from 13.5 to 20.06 mm. The head is pale yellowish-brown. The general color of the body is pale brownish-green with dark green markings. The thoracic and subdorsal spines are metallic bluish-black, with the bases of the latter reddish-orange. The caudal pair of spines are pale-yellow with their tips bluish-black. The thoracic legs, prolegs, and also venter are pale greenish-yellow. The last instar caterpillars measure from 20.06 to 33.95 mm. The general color of the last instar caterpillars is yellowish-green, with the thorax darker green. The color of the subdorsal spines is about the same as in the previous instar. The prothoracic and metathoracic spines are subequal, but the mesothoracic spines are shorter.

The chrysalid is 30.7 mm. long, 10.2 mm. wide, and 9.6 mm. thick, on the average. It is green with the edges of the wings and medio-dorsal horn brownish, sometimes with a touch of red. The pupa is long and slender, tapering gradually to the pointed caudal end. The cephalic end is roughly truncate and possesses noticeable cephalo-lateral projections, one at each side of the head. The horn is very conspicuous. There is a medio-dorsal ridge extending along the horn to the posterior margin of the mesothorax where its divides, the divisions extend to the abdomen forming the subdorsal abdominal ridges. There is another ridge found on each side of the abdomen especially prominent near the posterior.

The butterflies are 57 to 77 mm. when the wings are spread. **UPPERSIDE:** Male: the general color is black. *Fore Wing:* green markings found are as follows: a spot at the base of the costal margin; a big transverse basal bar in the cell, followed by 3 pairs of spots and a single one near the apex of the cell; two very small spots beyond; spots in the interspaces 1a and 1 forming transverse rows with the spots at the base of costal margin and in the cell; a discal series of spots, the size of which decreases toward the costal margin; and a postdiscal series of spots, which are comparatively small, and in interspace 1, there are two spots instead of one. The spots of both above-mentioned series found in interspace 7 are located

slightly toward the outer margin. *Hind Wing*: three transverse rows of spots which are somewhat parallel to the inner margin, the outer two rows are slightly curved; spots found in interspace 7 are largely white. There is a stripe, located at the base of the wing. The cilia of the hind wings are black alternated with white. The antennae, head, thorax, and abdomen, especially the dorsal band, are black; one greenish streak is found on each side of the above-mentioned parts. The eyes are dark brown. *UNDERSIDE*: The ground color of both wings is brownish-black, suffused with pink, especially along the costal margins, discal area, and inner margins of the hind wing. The markings are the same as found on upper-side, but inwardly marginated with red; black spots are found in interspaces 1, 6, and 7. The base of the costa of the fore wing is also reddish. The labial palpi, thorax, and abdomen are grayish-ochraceous with the first two touched with pink. The female is different from the male in having a greenish-white streak along the inner margin on both sides of the hind wing.

UPPERSIDE: Male and female: *Fore Wing*: the ground color is whitish with a greenish tinge at the base and on the apical area. The cell is crossed by five conspicuous black bands—the first one extending to the inner margin, the second one reaching vein 1, the third and fourth ones touching the median vein, and the fifth one extending along the discocellulars. There is a postdiscal black band extending from the costa to vein 2. A marginal black band is present. *Hind Wing*: the basal three-fourths are whitish; the markings on the underside can be seen from above due to the transparency of the wing. Conspicuous marginal black markings are found from interspaces 1a to 7. The submarginal area between veins 2 and 5 is largely black; submarginal markings are usually found in interspaces 5 and 6. The tail is largely black, edged and tipped with yellowish or ochraceous. Certain parts of the outer margin, especially at the apex of vein 2, are also yellowish or ochraceous. The head and prothorax are orange colored. The meso- and metathorax are bluish; the abdomen is whitish with yellowish tinge. A broad black median band extends from the head to the last abdominal segment. The antennae and eyes are black. *UNDERSIDE*: *Fore Wing*: the general color and markings are about the same as on the upperside. *Hind Wing*: the basal half is greenish, the outer half is yellowish, and the markings are black. There is a black spot at the anal angle, inside of which is a short band. Near the inner margin, there is a long line which curves above the above-mentioned short band outward to vein 2. A straight subbasal band extends from the costa to vein 2 where it joins the curved part of the line near the inner margin. Another band extends from the costa to the median vein. A discal series of spots is found in interspaces 3-7. A series of submarginal

spots (lunules in pairs) is found in interspaces 4, 5, 6, and 7. The submarginal areas of interspaces 2 and 3 are largely black. Terminal markings are present; the tail is largely black.

2. **Papilio antiphates** Cramer, 1775 or 1779 (pl. 13, fig. 4, 5)

Papilio antiphates Cramer, Pap. Exot. 1. 1775, p. 113, pl. 72, fig. A, B.

Eggs and young larvae were found on Ka Ying Chau or Chau Ping Ip (*Desmos cochinchinensis* Lour.) on the university campus and elsewhere on Honam Island, on April 27-30, and on May 11, 1937. The eggs hatched on the third day after they were collected so we know the incubation period is at least three days. The caterpillars spent from two to four days in stadia one to four, eight days in the fifth stadium. The pupal period required fourth months.

We have a female adult which was collected on White Cloud Mt., Canton, in 1923, and another which was collected on Loh Fau Shan, about 20 miles N.-NE. of Sheklung, Kwangtung Province, August 15, 1933.

The eggs are about 1.15 mm. in diameter, yellowish and globular as are the eggs of most of the species of this genus. The first instar larvae are under 5 mm. in length. They are pale yellowish-green or buff, quite hairy and spiny, and somewhat wider across the thorax. There is a large pair of caudal processes which are very spiny. On each of the first three segments there is a pair of very spiny tubercles. Each abdominal segment has some branched spines. Just caudad of the latero-dorsal spot on each side there is a pale bluish-white spot. The head is yellowish-brown with brown markings; body a little shining. The second instar larvae are about 5-7 mm. long. The head is pale amber and shining as if varnished but the body is no longer shining. It is noticeably wider across the thorax, tapered caudally. The three pairs of thoracic spines are colorless with a tinge of amber; the anal processes colorless and very prominent. The spines on abdomen have disappeared but the bluish-white spots are present, at least on meso- and metathorax. The third instar is 10 to 13 mm. in length. The general appearance of this instar is orange with dark transverse stripes (at junction of segments). In some specimens the color is of a greenish tinge instead of orange and the transverse bands are greenish-brown not blackish. Head amber color, shining, hairy, with black ocelli. The body shape is not greatly unlike that of *P. angememnon*. The pronotal spines extend somewhat upward, the other two pairs are almost horizontal; they are colorless with some dark on the upper (inner) sides, there is more black on the mesothoracic ones than on the others. The hairs are mostly whitish or colorless on all three pairs of spines. The head is not visible as the caterpillar is viewed from above. The caterpillar is dark orange, with the above-mentioned blackish transverse stripes or bands. The black on the anterior margin of the pronotum extends from one process to the other, otherwise the segment is orange with short black

hairs. The thoracic legs are colorless, shining. On the meso- and metathorax and on each abdominal segment there are two of the transverse blackish lines. There is an obscure broken median line on body, a bit more distinct on the thorax than on the abdomen. All prolegs are pale, shining on the sides. On meso- and metathorax and abdominal segments one to eight, the spots are now whitish but not very prominent. The last abdominal segment does not have any transverse blackish lines—is quite hairy. The processes are opaque whitish, shining. About half of the hairs are dark, the other half light. The individual hairs being either the one or the other, not half and half. The entire caterpillar is fairly hairy, especially on the sides of the prolegs. The fourth instar is from about 20 to 25 mm. in length. The newly molted fifth instar is yellowish-brown with no indication of stripes. The length is from 25-35 mm. later the stripes appear. The head is yellowish-brown, the thoracic spines blackish. The caudal spines are black at the tip in some specimens not in others. There is a dark transverse band on top of the metathorax. There is a broad brown lateral band for the entire length of the body. Beneath, pale. When examined on the sixth day a dark band is seen between the metathoracic spines. There is a dark band about 1 mm. broad along the lateral line, inclosing the spiracles which are vertical, whitish bordered with black, the black very thin at the top and the bottom. The caudal spines are dark, green at base, a little shining. There are green diagonal lines on abdominal segments 1 to 8. There is also a greenish latero-dorsal line on each side which is interrupted at the sutures between segments. Beneath, pale green, including legs, prolegs, etc. The lateral band is broader and darker on thorax and on abdominal segments 8 and beyond. One day later it was curved and had formed the silken loop and the following day it pupated.

The chrysalid is 28 mm. long, 12 mm. wide in greatest diameter (across anterior portion of abdomen), and 7 mm. thick. It is of the same type as the chrysalid of *P. agamemnon* but much different in shape, proportions, and markings. The general color is greenish. It is characterized by being constricted (7 mm. wide) at junction of thorax and abdomen, and much tapered caudally. The medio-dorsal horn is 1.5 mm. in length and brown at tip. The cephalic end is rounded truncate. There is a pair of latero-dorsal lines which are joined at the horn and also at the caudal extremity, but are 4 mm. apart in the center of the chrysalid. There are several diagonal lines on the dorsal side of the abdomen. There is a prominent reddish-brown band extending from the horn to the anterior margin of the chrysalid.

The adult may be described as follows: UPPERSIDE: Male and female: *Fore Wing*: the ground color is whitish with a greenish tinge at the base and on the apical area. The cell is crossed by five conspicuous black bands—the first one extending to the inner margin,

the second one reaching vein 1, the third and fourth ones touching the median vein, and the fifth one extending along the discocellulars. There is a postdiscal black band extending from the costa to vein 2. A marginal black band is present. *Hind Wing*: the basal three-fourths are whitish; the markings on the underside can be seen from above due to the transparency of the wing. Conspicuous marginal black markings are found from interspaces 1a to 7. The submarginal area between veins 2 and 5 is largely black; submarginal markings are usually found in interspaces 5 and 6. The tail is largely black, edged and tipped with yellowish or ochraceous. Certain parts of the outer margin, especially at the apex of vein 2, are also yellowish or ochraceous. The head and prothorax is orange colored. The meso- and metathorax are bluish; the abdomen is whitish with yellowish tinge. A broad black medial band extends from the head to the last abdominal segment. The antennae and eyes are black. *UNDERSIDE*: *Fore Wing*: the general color and markings are about the same as on the upperside. *Hind Wing*: the basal half is greenish, the outer half is yellowish, and the markings are black. There is a black spot at the anal angle, inside of which is a short band. Near the inner margin, there is a long line which curves above the above-mentioned short and outward to vein 2. A straight subbasal band extends from the costa to vein 2 where it joins the curved part of the line near the inner margin. Another band extends from the costa to the median vein. A discal series of spots is found in interspaces 3-7. A series of submarginal spots (lunules in pairs) is found in interspaces 4, 5, 6, and 7. The submarginal areas of interspaces 2 and 3 are largely black. Terminal markings are present; the tail is largely black.

3. *Papilio clytia* Linnaeus, 1758 (pl. 13, fig. 6, 7, 8, 9)

Papilio clytia Linn., Syst. Nat. ed. x, 1758, p. 479.

The caterpillars of various sizes were collected from the last week of September to the end of December. The eggs were obtained about the middle of April, and large caterpillars were also collected on the first ten days of May. The caterpillars feed on *Litsea glutinosa* (Lam.) C. B. R. In November, the second last stadium is 3 days; next to the last stadium 6 days; and the last stadium 13.3 days (as an average). In May, the last stadium is 6 days and the pupal stage lasts 14 days. Pupation took place during the first ten days of October and adults emerged from the last week of October to the beginning of November. The duration of the pupal stage is from 20 to 23 days. Specimens of the last generation of the year pupated from the last week of October to the middle of December and adults emerged from the last ten days of April to the beginning of May, covering a period of 154.5 days (as the average).

Adults were collected in Swatow, Kwangtung Province, July 7, Aug. 25, and Sept. 10 and 11, 1934; Loh Fau Shan, Kwangtung Province.

The general color of the egg is yellowish and its shape is round. The first instar caterpillars measure from 3 to 4 mm. in length. The general color is dark, nearly black, but the dorsum of the body and posterior end are pale or soiled flesh color. The body bears simple tubercles. The second instar caterpillars measure from 4 to 10 mm. in length. The general color is dark brownish. Later, a barely visible brownish-orange band appears on the dorsal area; the band is especially conspicuous near the posterior end which is nearly white. The head is black; it bears numerous hairs. The body bears stout fleshy tubercles which possess spinous projections, with the subdorsal row more conspicuous. The third instar caterpillars measure from 10 to 15 mm. long. The general color is bluish-black. Yellowish markings are found on the dorsum of the prothorax, medio-dorsal line, lateral area of the thorax and first three abdominal segments. On the sixth abdominal segment the medio-dorsal and lateral markings are connected. The lateral area of the sixth and seventh abdominal segments and dorsum of the eighth abdominal segment are also yellowish. The tubercles are more prominent. The subventral area and venter are largely yellowish. Red spots are also present on the body. The fourth instar caterpillars measure from 15 to 20 mm. in length. The general color is the same as in the previous instar but the yellow markings are more prominent. The fifth instar caterpillars measure from 20 to 40 mm. in length and can be described as follows: head dark; body possessing conspicuous longitudinal broken yellow bands and markings; rows of conspicuous black fleshy spines on the subdorsal area, the bases of which are red; on the anterior margin of the prothorax, the fleshy spines occur on the lateral area, and another one which is smaller is located on the level with the spiracles. On the mesothorax and metathorax, the dorsal, subdorsal, and lateral fleshy spines are also present. On abdominal segment nine, the subdorsal and lateral spines are inconspicuous, while the lateral spine is much shorter and smaller. All the fleshy spines bear minute hairs. The venter is also yellowish.

The chrysalid is 33 mm. long, 8 mm. wide, and 7.5 mm. thick. Before pupation, a mass of froth-like black and sticky secretion was given out. The caterpillar attached itself to the object, and the body became looped. Afterwards the chrysalid is supported by a girth and by its posterior extremity. The general color of the pupa appears to be varying shades of brown, ochraceous, and somewhat pale grayish-white. The chrysalid resembles a piece of bark or broken stick. The cephalic end is roughly truncate; the caudal end is gradually pointed and ventrally flattened; the anterior portion of the mesothorax is somewhat dorsally elevated. The body bears several rows of small tubercles which are located on the subdorsal, lateral and subspiracular regions. A row of small tubercles is found near the outer margin of the wing.

The butterflies of *Papilio clytia dissimilis* Linnaeus measure from 65 to 85 mm. when the wings are spread. UPPERSIDE: Male and female: the general color is black, with creamy-white markings. *Fore Wing*: the markings are as followings: a basal costal streak; an elongated and branched basal discoidal marking; beyond this three conspicuous spots, the lowest of which is more or less emarginate; three elongated stripes in interspace 1a, the middle one longest; a discal series of spots composed of two subtriangular spots in interspace 1, three elongated spots (with the outer margin emarginated) in interspaces 2, 3, and 4, two slender and long markings in interspaces 5 and 6, and a small spot in interspace 7; above the apex of the discoidal cell, a small spot is situated in interspace 9. Inside of the discal series there are some conspicuous markings below the cell. A postdiscal series of spots is found from interspaces 1 to 8. The first two spots are in interspace 1 while spots 3, 4, and 5 are subtriangular with their outer margin somewhat notched; beginning at interspace 5 the series bends inwardly. A terminal series of spots is found from interspaces 1 to 7. Finally a preapical spot is present. *Hind Wing*: the cell is chiefly occupied by a white marking which is more or less divided at its sides. A long and white marking is found at the base of each interspace (except interspace 8), as if they radiated from the outer margin of the cell. Those found in interspaces 2 to 5 have their outer margins incised. A much curved postdiscal series of spots is found in interspaces 2 to 7, with the first four spots pointed inwardly and emarginated with white. The antennae, head, thorax and abdomen are also black; the white subdorsal markings of head, thorax, and abdomen are present. The eyes are blackish-brown. UNDERSIDE: The ground color is black with pure white markings which are similar to those found on the upperside, but the underside differs from the upperside by having the postdiscal series of spots emarginated outwardly with yellow and in having the terminal series of spots more conspicuous. The head, thorax, and abdomen are spotted with white; white spots of the abdomen are arranged in rows.

The adults of *Papilio clytia clytia* Linnaeus measure from 68 to 82 mm. across the fore wings. UPPERSIDE: Male and female: *Fore Wing*: the ground color is blackish-brown with creamy white and yellow markings. The spots occupying interspaces 1a to 8, and those found in interspaces 2, 3, and 4 are pointed toward the discoidal cell and have the outer margin incised; starting from interspaces 5 the row shifts inwardly. A terminal series of markings is found between veins 1 and 8; a preapical spot is present. *Hind Wing*: a curved postdiscal series of markings is situated between veins 1 and 8, with whitish spots between veins 2 and 6 elongated-triangular, inwardly conical and outwardly emarginate, their centers brown. The yellow spots at the anal angle and a terminal series of yellow

spots are the same as the above-mentioned spots. The antennae, head, thorax, and abdomen are brownish-black; the head and thorax spotted with white. The eyes are brown. **UNDERSIDE:** the ground color is brown with the caudal margin and wing darker; the markings are white. Spots are found at the bases of both wings. The markings differ from those of the upperside in having those found on interspaces 1 to 5 less conspicuous inwardly; and the terminal yellow spots very prominent. The antennae, head, thorax, and abdomen are brownish-black; the antennae marked with white. The spots of the abdomen are arranged in several rows.

4. **Papilio demolus** Linnaeus, 1758 (pl. 13, fig. 10; pl. 14, fig. 1)

Papilio demoleus Linn., Syst. Nat. ed. x, 1758, p. 464.

The eggs of this species were collected on leaves of *Desmos cochinchinensis* Lour. on October 20. The young caterpillars were obtained in October, the first ten days of November, and in the middle of December. Mature caterpillars were collected about the middle of January, and different instar caterpillars were collected at the end of April and during May and June. This species feeds on *Citrus* spp., *Atlantia buxifolia* Oliv. (*Severinia buxifolia* Ten.), and *Desos cochinchinensis* Lour. In April, the second stadium requires 2 days, the third stadium 2 days, the fourth stadium 2 days, and the fifth stadium 8 days. The pupal stage requires 12 days. Pupation took place on May 12, and adults emerged in the last week of that month. In October the fifth stadium is from 8 to 10 days (average 9) and duration of the pupal stage is from 14 to 19 days (average 16). Pupation took place during the last ten days of October and adults emerged from the beginning to the middle of November. In November, the last stadium required 9 to 18 (average 13) days, and the duration of the pupal stage was from 28 to 141.3 days for the overwintering generation. Adults emerged in the middle of December and in the second week of April. In December, the third stadium requires 24 days, the fourth stadium 21 days, the fifth stadium 16 days, and pupal stage lasts 33 days. Pupation took place on May 8 and adults emerged on April 10.

Butterflies were collected: Hainan Island, South China, Jan. 8-13, July 19, and Aug. 1, 1934; Honam Island, Canton, Kwangtung Province, South China, Nov. 13, 1935.

The eggs are whitish-yellow, smooth and spherical. No preserved material is available for making measurements. The biggest size of the first instar caterpillars is 5.5 mm. in length, the second 5.5 to 8.5 mm., the third 8.5 to 15 mm., the fourth 15 to 23 mm., last 23 to 40 mm. Very small caterpillars are brownish, later the color changes to greenish-brown with white oblique bands. The mature caterpillars are green with a dark mottled girdle on the anterior margin of the mesothorax and one on the posterior margin of the first abdominal segment; two brown lateral bands are found on

abdominal segments 4, 5, and 6. Various brownish spots are also found on the abdomen, usually at the medio-dorsal area, and on each side of the subdorsal area of abdominal segments 7 and 8.

The chrysalid is 30 mm. in length, 11 mm. in maximum width, and 9 mm. in thickness. The general color is greenish, but it may vary to buff with the top of the abdomen yellow, or a mixture of light and darker gray. As viewed from above, the cephalic end is V-shaped, and the posterior extremity is truncate. The middle of the thorax is dorsally elevated and pointed forward. The surface of the body is rough, especially along the sides. Rows of conspicuous tubercles can be found on the subdorsal areas, wings and last two pairs of thoracic legs.

The wing expanse of the butterflies is 62 to 82 mm. UPPERSIDE: The ground color is black with creamy yellow markings. *Fore Wing*: the markings can be summarized as follows: a basal costal streak; the basal half of the cell and also the area below the cell occupied by a more or less complete transverse spotted line, beyond which are two large conspicuous spots; a curved spot at the upper apex. An elongated spot is found at the base of interspace 8. A much curved discal series of spots, irregular in size, occupies interspaces 1a to 8, those found in interspaces 6 and 7 are placed outwardly, and the spot in interspace 7 doubled. A sinuous postdiscal series of spots, variable in shape, is found from the inner margin to interspace 8. Finally, a terminal series of small spots is present. *Hind Wing*: the base, and also near the middle, irrorated with yellow scales. A conspicuous broad median irregular band is present, the inner margin of which is curved inwardly while the outer marking is very irregular and uneven. A sinuous postdiscal series of spots is found from interspaces 1 to 7. A terminal series of medium-sized lunular spots is also present. In interspace 7 there is a somewhat black ocellus marginated with a blue lunule. At the anal angle there is a conspicuous ochraceous-black oval spot which is also surmounted by a blue lunule. The antennae, head, thorax, and abdomen are black. A subdorsal creamy yellow streak is found on each side of the head and thorax; the posterior part of thorax and abdomen are irrorated with yellow scales. *UNDERSIDE*: *Fore Wing*: the ground color is dull black; the markings are for the most part similar to those found on the upperside, but the streaks found at the basal half of the cell and below it are ochraceous-yellow. Ochraceous-red and blue markings are also present, especially on the hind wing. The labial palpi, thorax, and abdomen are creamy yellow with lateral stripes on the thorax and four longitudinal stripes on the abdomen black.

5. **Papilio eurypylus** Linnaeus, 1758, (pl. 14, fig. 2, 3)

Papilio eurypylus Linn., Syst. Nat. ed. x, 1758, p. 464.

Caterpillars of various sizes were collected at the beginning of May and from the last ten days of May to the end of June; eggs

were also obtained on the last ten days of June. The caterpillars feed on *Desmos cochinchinensis* Lour., *Michelia alba* DC., *Cinnamomum pedunculatum* (Thunb.) Nees. (=*C. cassia*), and *Artabotrys uncinatus* (Linn.) Merr. In the months of May and June it takes about 32 days to complete its life cycle. The first stadium lasts from 3 to 6 (average 4.5) days, the second stadium 2 to 4 (average 2.75) days, the third stadium 2 to 5 (average 2.77) days; the fourth stadium 2 to 5 (average 3.21) days; fifth stadium 2 to 10 days (average 5.88), and the pupal stage, 3 to 11 (average 8.77) days. Adults emerged on June 25 and during the last twenty days of July.

Adults were collected in Swatow, Kwangtung Province, Sept. 7, 1934, and Hainan Island, South China, July 8 to 11, 1934.

The egg is spherical and dull whitish in color. It is 1 mm. in diameter. Shortly before hatching it is very light greenish. The first instar caterpillars measure from 2.7 to 7.5 mm. long. The general color is dark smoky brown; the dorsum of the prothorax is black; the posterior extremity is whitish. The body possesses simple spines; the head and the spines of the body are pale yellowish-brown. The venter and prolegs are pale, nearly white. The second instar caterpillars measure from 7.5 to 10.1 mm. in length. The general color is smoky black with a touch of brown on the posterior abdominal segments, and the posterior extremity whitish. The head is shining and light brown. The prothoracic, mesothoracic and metathoracic spines are light brown with black spinous projections; the bases of the caudal spines are white, the caudal pair also bears black spinous projections. A whitish subventral band is found on the abdominal segments. The thoracic legs are black while the prolegs are pale. Minute hairs are found on the head as well as on the body. The third instar caterpillars measure from 10.1 to 16 mm. in length. The head is shining and yellowish-brown. The general color is dark brown with the thorax smoky black. The caudal pair of spines is white. The subventral abdominal band is also white. The prolegs are pale, nearly white, while the thoracic legs are pale grayish-black. The thoracic spines are dark metallic blue; they bear conspicuous hairs as does also the anterior margin of the prothorax. The fourth instar caterpillars measure from 16 to 22 mm. long. The head is pale greenish-yellow. The body is brownish with a touch of green. The prothoracic spines, which are connected by a black line, are knob-like and black. The mesothoracic pair is largely red in this instar. Each of the metathoracic pair of spines is very short and is ringed by a black line at its base. The caudal spines are yellowish-white, black on the outer sides. The subventral band of the abdominal segments is still present. The spiracles are white, centered and ringed with black. The fifth instar caterpillars measure from 22 to 33.2 mm. in length. The general color of the head and body is dull greenish. The prothoracic spines are as in the previous instar. The mesothoracic spines are usually absent. The bases of

the metathoracic spines are greenish and marginated with black. The subventral band of the abdominal segments is present.

The chrysalid is 18 mm. in length, 9 mm. in width, and 7 mm. in thickness. The general color is pale greenish. The cephalic end of the chrysalid is broadly rounded and the posterior end is pointed. A very conspicuous frontal horn, on which the medio-dorsal and lateral ridges meet, is directed forward. The medio-dorsal ridge extends to the mesothorax on which it divides into two subdorsal ridges. Two subdorsal and two lateral ridges, one on each side, meet at the posterior extremity.

The butterflies are 54 to 69 mm. across the expanded wings. **UPPERSIDE:** Male and female: the ground color is brownish-black; the markings pale bluish-green. *Fore Wing:* the markings are as follows: three slender oblique streaks followed by two irregular markings in the cell; in the discal series of eight spots occupying interspaces 8 to the inner margin, the size of the spots decreases toward the inner margin—especially is the one found in interspace 5 much smaller. A postdiscal spot is found on interspace 7. The submarginal series of 6 spots occupies the first 8 interspaces; sometimes an inconspicuous spot is also found in interspace 1. In interspaces 1a and 1 there are two slender oblique lines which form a line with the basal discoidal streak. *Hind Wing:* a transverse white band near the costal margin, extending to interspace 2, is a continuation of the discal band on the fore wing. An irregular and curved submarginal series of spots is also present. The cilia of both the fore and hind wings are brownish-black, but on the hind wing they are alternated with white. The antennae, head, thorax, and abdomen are dark, nearly black. The head and thorax are subdorsally covered by grayish-blue hairs. A lateral whitish band is found on the abdomen. **UNDERSIDE:** The ground color is blackish-brown. The markings of both wings are the same as those on the upperside, but the edges of the markings diffuse into a silvery-white. In addition, the anterior portion of the discal band of the hind wing is interrupted by a black marking which extends to vein 7; in the above-mentioned black marking the area above vein 8 is crimson. The subbasal black transverse bar, and spots in interspaces 2 and 3, are largely marginated with crimson.

6. **Papilio helenus** Linnaeus, 1758 (pl. 14, fig. 4, 5)

Papilio helenus Linn., Syst. Nat. ed. x, 1758, p. 459.

A full-grown caterpillar was obtained on October 24, on *Zanthoxylum avicinnae* (L.) DC. From October 27 to March 13, 1936, the duration of the pupal stage was 163 days.

Adults of this species were collected on White Cloud Mountain, Canton, March 21, 1923, and on Loh Fau Shan, Kwangtung Province, South China, July 23, 1935. A specimen was obtained in Yunnanfu, Yunnan Province, South China, August 1932, and another on Hainan Island, South China, August 5-6, 1935.

The butterfly measures 84 mm. across the fore wing. **UPPERSIDE:** Male and female: the general color is velvety brown, but broadly pale toward the outer margin of the fore wing. There are four slender lines found in the cell. The outer internervular streaks are present. A conspicuous yellowish-white discal patch occurs on the hind wing; it is composed of a quadrate spot occupying interspace 7, and two elongated quadrate markings located in interspaces 5 and 6. The outer margin of the discal patch is zigzag. A terminal series of black spots, which are inwardly margined with red, is found on some specimens; those found in interspace 1 and on the anal angle are more conspicuous, almost ringed with red, and usually present. The antennae, head, thorax, and abdomen are largely black. **UNDERSIDE:** The general color and markings are similar to those on the upperside, but greyish-white scales are especially abundant on the fore wing. The discal patch of the hind wing is pure white and is widely separated by the veins. There is an inner broad red lunular spot in interspace 2 in the continuation of the inner portion of the red ring, found at the anal angle, and transversed by a line of whitish scales. The head, thorax and abdomen are black, while the abdomen is touched with grayish-white along the lateral areas.

7. **Papilio paris** Linnaeus, 1758 (pl. 14, fig. 6)

Papilio paris Linn., Syst. Nat. ed. x, 1758, p. 459, pl. 13, fig. 90.

The caterpillars were collected in the middle of May and June. The food plant is *Zanthorygium ariennae* (L.) DC. The eggs were found in the third week of March and June. The young caterpillars were collected from the middle of June to the beginning of July. From June to July it takes about 26 days to complete the life cycle. The first stadium is 2 days, the second stadium 5, the third stadium 2, the fourth stadium 5 to 8 (average 6.5), the last stadium 7 to 14 (average 10); and the pupal stage 11 to 13 (average 12) days. Pupation took place during the first ten days of June and the first twenty days of July; adults emerged within the last ten days of the above-mentioned two months.

Adults are in our collection from: Hainan Island, South China, July 14-15 and Sept. 1-3, 1935; White Cloud Mountain, Canton, South China, March 1, 1923; Loh Fau Shan, Kwangtung Province, South China, April 6-8, 1934.

The egg is 1.5 mm. in diameter; it is spherical and smooth. The early stage of the egg is dull yellowish, and shortly before hatching it is dark. The first instar caterpillars measure from 3 to 5 mm. in length. The ground color varies from very pale greenish to dark brown. The head is pale brownish and bears rows of tubercles which possess somewhat fleshy spinous projections. On the subdorsal area the cephalic pair and those near the posterior end are comparatively longer. The side is dirty green and also bears numerous fine hairs. The venter is pale. The second instar caterpillars measure from 5

to 9 mm. long, the third instar caterpillars from 9 to 12 mm. long, the fourth instar caterpillars 12 to 25 mm., and the last instar caterpillars 25 to 35 mm. The body of the second instar caterpillar bears six rows of tubercles, which possess spinous projections, and which are found on the dorsal, subdorsal, and lateral areas. Those found on the dorsal area are not conspicuous, those found on the subdorsal area are prominent, but those found on the lateral areas are not so distinct as those on the dorsal areas. In the third and fourth instar caterpillars the tubercles on the thorax change to knob-like structures, and the spinous projections of the abdomen are faintly distinguishable. The general color of the fifth instar caterpillars is green with the thorax deeper green. Viewed dorsally conspicuous fine wavy lines are found on the thorax, and a pair of reddish eye-like spots is located on each side of the thorax at the point of its greatest width. A lateral yellowish-white band is found on the abdomen. The legs and also the venter are light green.

The chrysalid is 30 mm. long, 11 mm. wide, and 10 mm. thick. The general color is pale green. The cephalic end is produced into two cephalo-lateral processes; the posterior end is gradually reduced and truncate at its tips. The ventral line of the pupa is curved near the middle portion. As viewed dorsally, the medio-dorsal and lateral ridges are conspicuous and appear rooflike. Minute hairs, punctures, and tubercles are present.

The male butterfly is 77 mm. and the female 97 mm. across the fore wings. **UPPERSIDE:** Male: *Fore Wing*: the ground color is brownish-black irrorated with green scales which form a postdiscal band extending from the inner margin to slightly above the middle of the fore wing. *Hind Wing*: the irroration of the green scales does not extend to the costal margin; part of the outer margin of the irroration is interrupted by a conspicuous metallic blue patch which occupies the base of interspace 4 and the outer portion of interspaces 5 and 6; the inner margin of the patch is evenly arched and its outer margin is zigzag. There is a conspicuous ocellus marginated with a dull orange-red area. An inconspicuous discal irregular green band extends from the metallic blue patch to the inner margin and slightly above the anal ocellus. Another indistinct postdiscal band of the same color is found in interspaces 2, 3, and 4. An orange-colored lunula is found in interspace 7 or directly above the metallic blue patch. The antennae, head, thorax and abdomen are black and except the antennae, are irrorated with green scales. Cilia are brownish-black and alternated with white, especially the hind wing. **UNDERSIDE:** *Fore Wing*: the ground color is brownish, irrorated with yellow scales especially on the basal half of the wings. The pale grayish-white area, which is formed by the internervular bands, is shortened near the inner margin and becomes gradually larger to the costal margin, and starting from the discal region extends to near the outer margin. *Hind Wing*: a conspicuous series of submarginal

dull orange-red lunules is transversed by short lilaceous-blue lines. But sometimes those in interspaces 1, 2, and 3 appear to be more or less completely or largely black-centered ocelli, because they are dull to the admarginal portion of the dull orange-red ring. The head, thorax, and abdomen are also brownish-black. The females are similar to the males in color as well as in markings.

8. **Papilio polytes** Linnaeus, 1758 (pl. 14, fig. 7, 8, 9)

Papilio polytes Linn., Syst. Nat. ed. x, 1758, p. 460, ♀.

October, in the middle of November, and in the third week of June. October, in the middle of November, and in the third week of June. Eggs were collected in the first week of May. The food plants are *Zanthoxylum nitidum* DC., *Atlantia buxifolia* (Benth.) Oliv. and *Citrus* spp. The overwintering specimens spend 8 days in the second last stadium, 15 days in the last stadium, while the duration the pupal stage is from 127 to 165 days. Adults emerged on April 7 and 17. In the months of May, June, and July, the first stadium is 3 days, the second stadium 3 days, the third stadium 2 days, the fourth stadium 2, and the last stadium 5 days. The pupal stage lasts 5 to 12 (average 10) days. Adults emerged on the first ten days of May and July.

The eggs are laid singly on both the upperside and the underside of the young leaves, usually near their edges. They are slightly greater than 1 mm. in diameter, spherical, yellowish and smooth. Shortly before hatching the egg is dark. The first instar caterpillars are from 2.5 to 5.3 mm. long, the second instar 5.5 to 8 mm., the third instar 8 to 15 mm., the fourth instar 15 to 20 mm., and the fifth instar 20-40 mm. in length. The general color of the first instar caterpillars is a dirty pale brownish, and the venter is still paler. The head is blackish and shining. The second and third instar caterpillars are generally dark brownish-green in color, smeared with two elongated patches on the sides of the body, starting from the thorax and extending irregularly dorsally; there are two similar patches, one on each side of the posterior extremity. The fourth instar caterpillars are brownish-green with knob-like structures on thorax, and the whitish patches of the body are still present. The fifth instar caterpillars are greenish. Two blackish, mottled girdles are present, a curved one situated at the anterior margin of the metathorax and another one along the posterior margin of the first abdominal segment. There are two, sometimes four, brownish oblique bands extending from the lateral area to the dorsal side of abdominal segments, 4, 5 and 6, but not touching each other.

The chrysalid is 30 mm. long, 12 mm. wide, and 9 mm. thick. Its general color varies from greenish to light brownish. The chrysalid bends at an angle of about 90 degrees. The cephalic process is cleft at varying depths, usually diverged. The thorax is dorsally

elevated. The body is ventrally swollen where the chrysalid is bent and gradually reduced to the small truncate posterior tip.

The butterflies measure from 72 mm. to 88 mm. across the expanded fore wings. **UPPERSIDE:** Male and female: the ground color is black with creamy white markings. *Fore Wing:* the cell and discal area are irrorated with yellow scales which are arranged in the discoidal and internervular streaks. The spots of the terminal series decrease in size toward the costal margin. *Hind Wing:* a transverse discal series of elongated and somewhat quadrate spots extends from the inner margin to interspace 7. At the anal angle the blue scales are arranged in a lunule; in certain specimens the blue scales are sparsely deposited on the postdiscal area. The cilia of the hind wing are black alternated with creamy white. The antennae, head, thorax, and abdomen are also black, with the head and posterior part of the thorax spotted. **UNDERSIDE:** The markings are similar to those on the upperside, but differ from the above by having a more or less complete postdiscal series of yellowish spots. In addition, blue scales are found outside of the spots which are located in interspaces 1 and 2. An orange-colored lunular marking is found near the anal angle. A terminal series of white spots located between veins 1 and 8. The labial palpi are whitish. The thorax and abdomen are largely black; the former is spotted while the latter is striated with white.

CYRUS-FORM: **UPPERSIDE:** Male and female: the general color and markings are as mentioned above, but the creamy white markings are more prominent and larger. At the anal angle there is a dull reddish marking which varies from a lunular spot to a somewhat ocellus-like structure. In certain specimens, a few dull reddish lunular submarginal spots are distinguishable. The blue scales are especially abundant near the anal ocellus. **UNDERSIDE:** The submarginal series of lunules are conspicuous and complete, the color varying from ochraceous-orange to bright reddish-orange.

POLYTES-FORM **UPPERSIDE:** The ground color is sooty black, especially the wings. *Fore Wing:* The base and terminal margins are darker. The discoidal and internervular streaks are present. *Hind Wing:* a white spot tinged with rusty yellow is found at the apex of the cell. Elongated markings of the same color are found at the base of interspaces 2, 3, 4 and 5. The lower half of interspace 1 is dark red, irrorated with blue scales and possesses a superimposed black anal spot; this dark red area may be interrupted with the ground color above the anal marking and extended to interspace 2 or touch the white markings. A much curved complete submarginal series of dark red lunules are found between veins 2 and 8. The cilia of both fore and hind wings are sooty black, alternated with white. The antennae, head, thorax, and abdomen are also sooty black, with the anterior portion of the thorax subdorsally spotted. **UNDERSIDE:** The ground color and markings are similar to the upperside, but the

pale area of the fore wing is more conspicuous; the terminal series of spots, the color of which varies from pale to orange-red, is present. The head, thorax, and abdomen are sooty black, while part of the thorax is spotted and the abdomen is longitudinally striated with white.

9. **Papilio protenor** Cramer (1775) (pl. 14, fig. 10; pl., 15, fig. 1, 2)

Papilio protenor Cramer, Pap. Exot. i. 1775, p. 77, pl. 49, figs. A. B.

A medium-sized caterpillar was collected at the end of October feeding on *Citrus* sp., a young caterpillar was secured in mid-December, and one full-grown caterpillar was obtained during the first ten days of May. The caterpillars also feed on *Zanthoxylum nitidum* DC. The last stadium of the overwintering generation is 12 days and the pupal stage lasts 79 days. The one collected in December spent 13 days in the third stadium, the fourth stadium required 12 days, and the last stadium 19 days. The duration of the pupal stage is 29 days. Pupation took place during the first ten days of March. In May the pupal stage requires 11 days.

Adults were collected on Loh Fau Shan, August 15, 1933; and Lingnan University Campus, Canton, June 1, 1934.

The third instar caterpillar varies from 11 to 17 mm. in length, the fourth instar from 17 to 25 mm, and last instar from 25 to 42 mm. The general color of the young caterpillars is greenish-brown, with a smear of irregular whitish on abdomen. The mature caterpillar is greenish or pale green.

The chrysalid is 30 mm. in length, 12 mm. in maximum width, and 9 mm. in thickness. Its general color is dark brownish and it resembles a piece of rough bark. Two cephalic processes, somewhat parallel to each other, possess 2 small niches, one near the base and one near the tip. The thorax is dorsally elevated and has two short dorsal ridges meeting on the mesothorax. It is ventrally swollen in the middle of the body, where it bends at an angle of about 45 degrees. The posterior end is much more reduced and truncate.

The butterflies are 82 to 95 mm. when the wings are spread. UPPERSIDE: Male: the general color is velvety black, sparsely irrorated with metallic blue scales. *Fore Wing*: the adnervular streaks are pale grayish and extend to the outer margin of the wing. *Hind Wing*: it is characterized by a dark bluish gloss; there is a white subcostal streak (which is largely covered by the fore wing in a spread specimen). At the anal angle, there is a dull reddish ocellus with a black center, which is anteriorly superimposed by lilaceous scales. The antennae, thorax and abdomen, are velvety black, while the head and anterior part of thorax are marked with white. Cilia are black with their tips largely white, especially on the hind wing. UNDERSIDE: *Fore Wing*: blackish; adnervular streaks paler and broader, scales present. *Hind Wing*: ground color

resembles the upperside. At the anal angle, there is a black-centered, irregular, dull pinkish patch which extends to interspace 2, and which is superimposed with lilaceous scales. Lunules of the same color are found in interspaces 2, 6, and 7, and faintly in interspace 5 where it is somewhat irrorated with lilaceous scales. Head, thorax, and abdomen are brownish-black. *UPPERSIDE*: Female: the female is blackish-brown. *Fore Wing*: the brownish adnervular streaks are paler and broader, and whitish scales are present. *Hind Wing*: the white subcostal streak is wanting, but a dense sprinkling of the metallic blue scales on the outer portion is present. The anal angle marking is similar to that in the male. In interspace 2, there is a subterminal black spot which is surrounded by an incomplete, dull red, crescent-like marking. *UNDERSIDE*: *Fore Wing*: pale brownish and the adnervular streaks pale and broader. The markings resemble those on the upperside.

Explanation of Plates

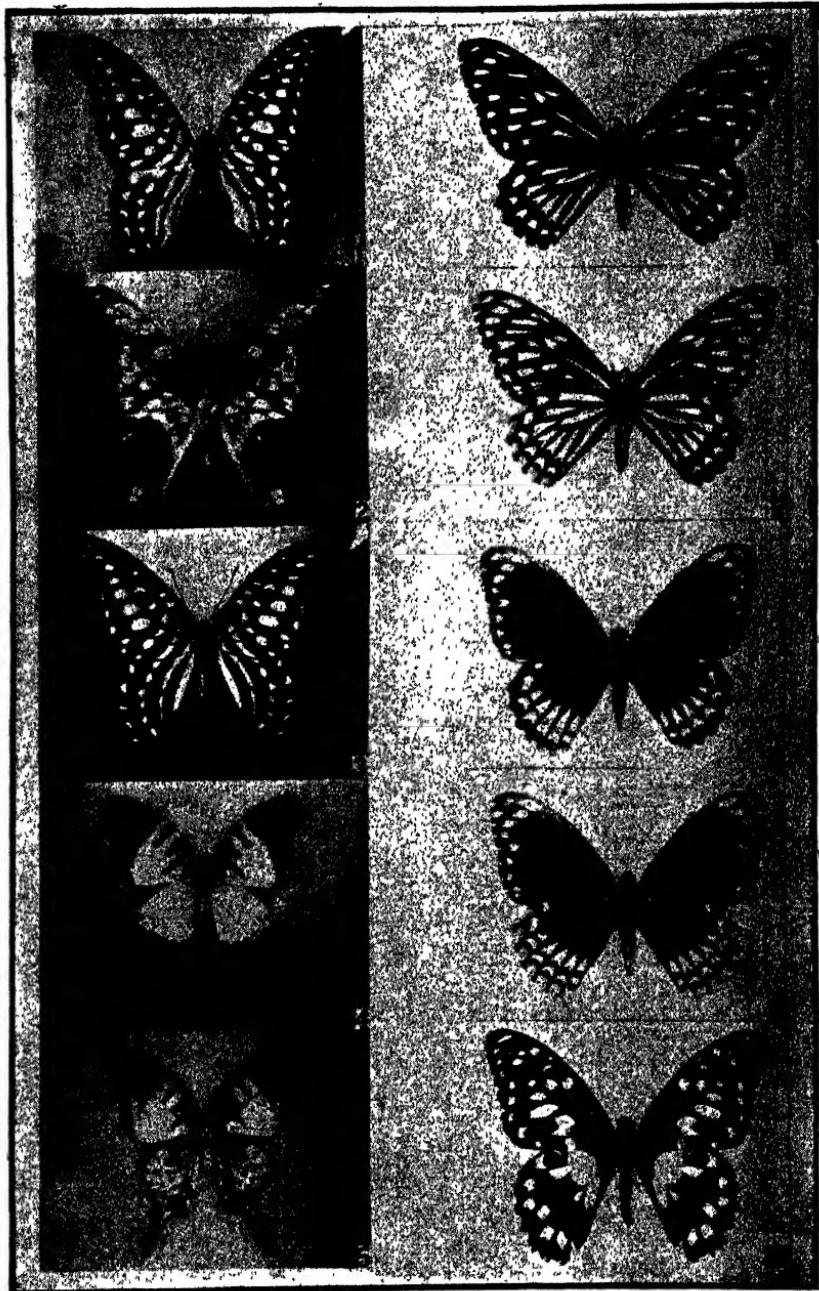
Plate 13

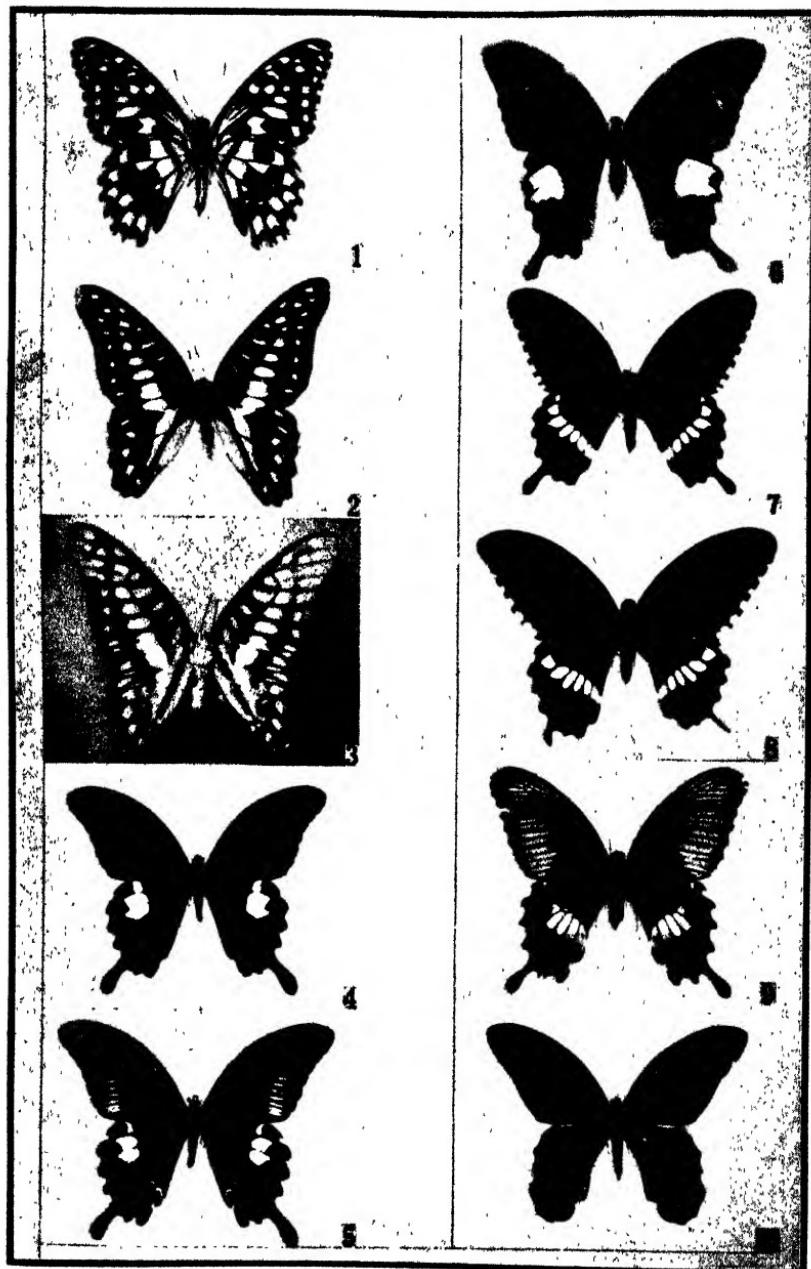
- Fig. 1. *Papilio agamemnon* Linnaeus, 1758, dorsal side ♂.
2. *P. agamemnon* Linnaeus, 1758, ventral side ♂.
3. *P. agamemnon* Linnaeus, 1758, dorsal side ♀.
4. *P. antiphates* Cramer, 1775 or 1779, dorsal side ♀.
5. *P. antiphates* Cramer, 1775 or 1779, ventral side ♀.
6. *P. clytia dissimilis* Linnaeus, 1758, dorsal side ♂.
7. *P. clytia dissimilis* Linnaeus, 1758, ventral side ♀.
8. *P. clytia* Linnaeus, 1758, dorsal side ♀.
9. *P. clytia clytia* Linnaeus, 1758, ventral side ♀.
10. *P. demoleus* Linnaeus, 1758, dorsal side ♂.

Plate 14

- Fig. 1. *Papilio demoleus* Linnaeus, 1758, ventral side ♂.
2. *P. eurypylus* Linnaeus, 1758, dorsal side ♂.
3. *P. eurypylus* Linnaeus, 1758, ventral side ♂.
4. *P. helenus* Linnaeus, 1758, dorsal side ♂.
5. *P. helenus* Linnaeus, 1758, ventral side ♂.
6. *P. paris* Linnaeus, 1758, dorsal side ♀.
7. *P. polytes* Linnaeus, 1758, dorsal side ♂.
8. *P. polytes cyrus* form, dorsal side ♀.
9. *P. polytes polytes* form, dorsal side ♀.
10. *P. protonor* Cramer, 1775 or 1779, dorsal side ♂.

(To be concluded)





NOTES ON A SMALL COLLECTION OF FISHES FROM KWANGTUNG PROVINCE INCLUDING HAINAN, CHINA

By ALBERT W. C. T. HERRE
Stanford University, California.

In November, 1936, I was able to spend a few weeks at Lingnan University, Canton, and vicinity, collecting and studying fishes. The fish fauna of southern China is very rich in individuals and numbers of different kinds. Although fishes have been collected at Canton ever since the time of Linnaeus, they are still not sufficiently known, in spite of the labors of recent students, particularly Mr. Lin Shu-yen.

Extensive collections have been made in Hainan by C. H. Pope, and reported upon by Nichols and Pope. Several other naturalists have also collected fishes there in recent years, notably Professor William E. Hoffmann, Professor S. F. Light, and J. L. Gressitt. These have been studied by Oshima, the present writer, and others. There is ample evidence that the fresh-water fishes of Hainan are quite imperfectly known, while almost nothing is known of the very luxuriant marine fauna, particularly of the coral reefs along the southern shore. There is no question that extensive and intensive collecting of both marine and fresh-water fishes of Hainan would reveal striking similarities with the fresh-water fauna of Indo-China, and with the marine fishes of the Philippines and Singapore.

The brief paper here presented is based on fragmentary collections made by Professor Hoffmann and assistants at various places in Kwangtung including Hainan Island, and by E. R. Tinkham at several localities in Kwangtung, Kwangsi, and Yunnan Provinces. As has been stated in my earlier papers, our knowledge of the fish fauna of southern China will remain fragmentary until intensive collecting has been done in the following regions: the entire coastal area, including the small off-shore islands, from Swatow to the Tongking boundary; the mountain streams along the northern and the southwestern boundaries of Kwangtung Province; the rivers and hill streams of Kwangsi Province; to this should be added the streams of Yunnan, where only sporadic collecting has been done. Yunnan streams flow into Tongkong, and high mountains cut the province off from Kwangsi, but a knowledge of Yunnan fishes is necessary before we can have a complete view of the fishes of southern China. Several large collections of the fresh-water fishes of Kwangsi and Kwangtung Provinces have been made, and at least one good collection of the marine fishes of the south coast of Hainan, but thus far none of these has ever been studied; in view of the war-torn

conditions and appalling vandalism of invaders, it is unlikely that they ever will be studied. In view of the great economic importance of both fresh-water and marine fisheries to the people of south China, every effort should be made when peace is restored to make a complete survey of the fishes of southern China.

All measurements given are the standard length, that is, without the caudal fin. All the species named, including types of new species, are in the natural history museum of Stanford University, California, U.S.A.

Family SCYLLIORHINIDAE

1. *Halaelurus bürgeri* (Müller and Henle)

A specimen 106 mm. long, was taken off Hainan. It has two rows of spines along the back, from the nape to a point almost over the ventrals, just as described by Günther in Cat. Fish. Brit. Mus. 8:404, 1870.

Family RAJIDAE

2. *Raja porosa* Günther

One specimen with a breadth of 185 mm. and length of 275 mm. From the Southwest Kwangtung Fisheries Experiment Station.

Family CHANIDAE

3. *Chanos chanos* (Forskal)

One specimen, 128 mm. long, from Hoihow, Hainan.

Family SYNBRANCHIDAE

4. *Fluta alba* (Zuieuw)

A specimen 220 mm. long, from Maan Chi Shaan, northern Kwangtung, collected by W. T. Tsang.

Family OPHICHTHYIDAE

5. *Cirrhimuraena paucidens* Herre and Myers

One specimen, 152 mm long, was obtained in southwestern Kwangtung, near Pakhoi by W. E. Hoffmann. Hitherto known only from the type specimen, collected at Hoihow, Hainan.

Family MASTACEMBELIDAE

6. *Mastacembelus sinensis* (Bleeker)

Five specimens were taken from mountain streams near the monastery of Ting Wu, Kwangtung Province, their lengths 58 to 126 mm. Dorsal XXX-XXXI-60; anal III-60 to 65. The snout is naked and there are no suborbital or preopercular spines; the mouth extends to the middle of the pupil.

Family BAGRIDAE**7. *Leiocassis hainanensis* Tchang**

One specimen, 59 mm. long, of this rare cat-fish was obtained from Hainan.

Family CYPRINIDAE**8. *Aphyocyparis normalis* Nichols and Pope**

Thirty-three specimens were taken from a mountain brook near Ting Wu Monastery, Kwangtung Province, their lengths 24 to 89 mm.

9. *Pseudorasbora parva* (Schlegel)

Three specimens, 56 to 67 mm. in length; they are all remarkable for the great development of tubercles on the snout, chin, and sides of the head; the tubercles are few in number, but large and red. Taken at Taam-Yuen-tung, Lien District, Kwangtung Province, by F. K. To.

10. *Toxabramis argentifer* Abbott

Eight specimens, 22 to 53 mm. long, from Kwangsi Province.

11. *Lissochilus hemispinus* (Nichols)

Two specimens, 23 to 25 mm., from Lung T'au Shan, Kwangtung Province (W. T. Tsang), and 6 from Ting Wu Shan, 47 to 72 mm.

12. *Lissochilus labiatus* (Regan)

A specimen of 60 mm. from Man Chi Shan, and 3, from 56 to 78 mm., from Lung T'au Shan, northern Kwangtung (W. T. Tsang).

13. *Osteochilus brevis* Lin

Four specimens, 28 to 35 mm., from Kwangsi Province.

14. *Osteochilus salsburyi* Nichols and Pope

A specimen 50 mm. long was taken by E. R. Tinkham in Kwangsi Province. Dorsal III-12; anal III-5; scales in lateral line 34; 7 above and 5 below the lateral line; eye 4 in head.

15. *Garra schismatorhyncha* Nichols and Pope

A specimen 112 mm. long was taken in Hainan.

Family COBITIDAE**16. *Botia superciliaris* Günther**

A specimen 56 mm. long was taken at Cheung Kon Ts'u'en, Hainan, by F. K. To.

17. *Misgurnus mizolepis* Günther

A specimen 85 mm. long from Loh Fau Shan, Kwangtung Province.

18. *Misgurnus mizolepis fukien* Nichols

Two specimens, 43 and 53 mm. long, from White Cloud Mt., Canton.

19. *Misgurnus mizolepis hainan* Nichols and Pope

Two specimens, 78 and 100 mm. in length, from Kacheck, Hainan.

20. *Misgurnus mohoity yunnan* Nichols

A specimen 79 mm. long was taken at Yunnan-Fu by Mr. E. R. Tinkham.

21. *Nemachilus fasciolatus* (Nichols)

A fine specimen, 48 mm. long, from Cheung Kon Ts'uen, Hainan (F. K. To).

22. *Nemachilus humilis* Lin

Ten specimens 27 to 56 mm. in length, from Lung T'au Shan, Kwangtung Province (W. T. Tsang). Dorsal II-8 and III-7 or 8; anal II-5; the depth is 6.9 to 7, the head 4 to 4.25, the caudal 4.4 to 4.6 times in the length. The eye is 6 to 6.3 times in the head and 2.4 to 2.6 in the snout; the snout is 2.4 to 2.5 times, the least depth of the caudal 1.87 in the head.

Family HOMALOPTERIDAE**23. *Beaufortia leveretti* (Nichols and Pope)**

An example 49 mm. long was collected at Cheung Kon Ts'uen, Hainan (F. K. To).

24. *Crossostoma stigmata* Nichols

Two specimens, 47 and 49 mm. long, from Loh Fau Shan, Kwangtung.

25. *Crossostoma tinkhami* Herre

A specimen, 46 mm. long, from Kwangtung Province.

26. *Pseudogastromyzon myersi* Herre

A specimen 29 mm. long, from Lantau Island, a small mountainous island not far from Hong Kong (Y. W. Djou). Hitherto known from one specimen collected on Hong Kong Island.

Dorsal I-7; anal I-5; pectoral II-16; ventral I-8; about 70 scales in the lateral line.

The color in alcohol is uniform dark dull brown, with 6 pale cross bands, the first under the dorsal, the last at the rear end of the caudal peduncle; narrow paler stripes over the back; the head is marked by many curving dark brown lines, giving it something of a brindled or mottled look; a black spot at the caudal base, with 4 blackish-brown cross bars on the caudal fin; the dorsal is clear, with

a black spot at the base of the first two rays, two cross rows of black spots; and a black margin. The other fins are clear, the pectoral with 4, the ventral with 2 transverse rows of black spots.

27. *Sinohomaloptera hoffmanni* n. sp. (fig. 1)

Dorsal III-7, the first simple ray distinct, very short, less than half of eye; anal II-5, the simple rays so closely appressed as to seem but one; pectoral with 7 simple and 11 divided rays; the eighth ray is large, thick, and like the 7 preceding simple rays, but is really divided nearly to its base into two very closely appressed equal parts; ventral with 2 simple and 8 divided rays; 61 or 62 scales in the lateral line, plus 2 more on the caudal base.

The depth is 6.95 to 7.1, the breadth 5.8 to 6, the head 4.4 to 4.5, the pectoral 3.5 to 3.7, the ventral 3.4 to 3.5 times in the length; the

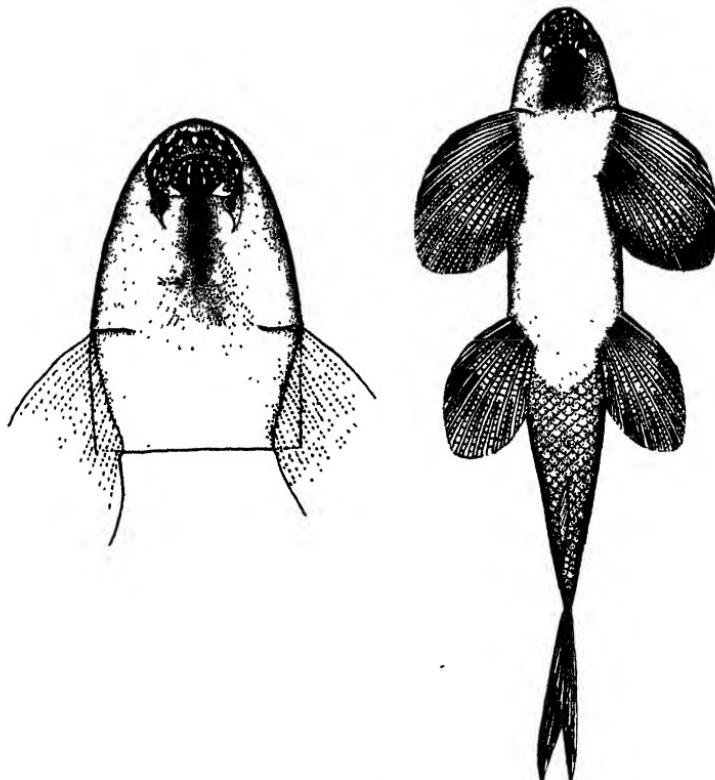


Fig. 1. *Sinohomaloptera hoffmanni* Herre, new species.

deeply lunate caudal equals the head. The snout is 1.8 times in the head, the eye 5.8; the postorbital region is twice, the eye 3.2 times

in the snout; the eyes are dorso-lateral, not visible from below, the interorbital space twice the eye diameter; the least depth of the slender caudal peduncle is 3.3 in the head and 2.25 times in its own length.

The elongate body is broadly rounded when seen from above, becoming laterally compressed behind the ventral tip; the dorsal profile forms a broad curve to the flattened and rounded snout tip: the ventral surface is naked and flattened from the snout to the hind end of the ventral base, and naked from there about half way to the vent; the rest of the body is covered with keeled scales except about the anus, where they are smooth. The head is naked, covered dorsally with longitudinal keels which pass into very low pointed tubercles on the sides and ventrally; where these drop off or are removed the skin beneath is seen to be reticulato-pitted.

A deep groove separates the rostral fold from the upper lip, and continues around the corners of the small crescent-shaped mouth on the under side of the head; the rostral fold has a median lobe, and 2 short barbels on each side of it; at each angle of the mouth is a pair of barbels, the inner one very much smaller than the outer, the upper lip has 2 rows of short stout papillae, apparently 11 in the outer, and 9 in the inner row, but evidently the numbers are variable; the lower lip has a row of 8 or 10 papillae, with either 2 or 4 others behind the middle portion.

The pectoral extends to a vertical from the dorsal origin; the distance from the tip of the snout to the dorsal origin is 45.3% to 47%, and from the dorsal origin to caudal base 54.7 to 53% of the length; the dorsal is low, its height 1.1 to 1.2, the anal height 1.45 to 1.6 times in the head. The dorsal origin is slightly in advance of the ventral origin, not of the anal as stated by Hora. The anal is far back, the pre-anal length 78.8%, the distance from the anal origin to the caudal base 21.2% of the total length.

The general color in alcohol is brown, with 7 large dark brown circular spots along the back, the three behind the dorsal being white-margined ocelli, which may have a white bar or spot in the middle; a complete or partial dark brown bar along the middle of the side; the pectorals, ventrals, and caudal crossed by black and whitish bars. In life all the above mentioned white markings were yellow.

Four specimens, 62 to 83 mm. in length, were taken at Cheung Kon Ts'uen, Hainan, by F. K. To. The type and one paratype are in the Stanford University collection; the other specimens are in the Lingnan Natural History Survey and Museum, at Canton, China.

Named in honor of my friend William E. Hoffmann, distinguished entomologist and Director of the Lingnan Natural History Survey and Museum.

Family SYNODONTIDAE

28. *Saurida eso* Jordan and Herre

A specimen 105 mm. long, from Hoihow, Hainan.

Family SYGNATHIDAE

29. *Syngnathus acus* L

A specimen 184 mm. long, taken near Pakhoi, Kwangtung Province by W. E. Hoffmann. Rings 19 plus 38, the trunk contained twice in the tail; dorsal 36, on 8 caudal rings; the median crista of trunk and superior crista of tail are continuous.

30. *Hippocampus histrix* Kaup.

Two specimens, 40 to 55 mm., from Pakhoi, Kwangtung Province (W. E. Hoffmann).

Family HEMIRAMPHIDAE

31. *Hemiramphus sinensis* Günther

A specimen 102 mm. long from Hoihow, Hainan (W. E. Hoffmann).

Family OPHICEPHALIDAE

32. *Ophicephalus gachua* Buch. Hamilton

A very poor specimen 82 mm. long was taken at Kacheck, Hainan.

Family ANABANTIDAE

33. *Macropodus chinensis* (Bloch)

Three examples, 34 to 36 mm. in length, from Mui Yuen, Lung Nga Mt., Kwangtung Province (K. C. Yeung and K. S. Chan).

Family LEIOGNATHIDAE

34. *Leiognathus nuchalis* (Schlegel)

A specimen 70 mm. long, from Hoihow, Hainan.

Family LACTARIIDAE

35. *Lactarius lactarius* (Bl. and Schn.)

Two specimens, 106 and 124 mm. long, from Hoihow, Hainan.

Family OPLEGNATHIDAE

36. *Oplegnathus fasciatus* (Schlegel) (fig. 2)

Three juvenile specimens, 12.5 to 15 mm. in length, are in the *Tholichthys* stage, and show beautifully the affinities of this family

with the Chaetodontidae. Dorsal XI-17; anal IV-12. From Lantau Island, Kwangtung Province.

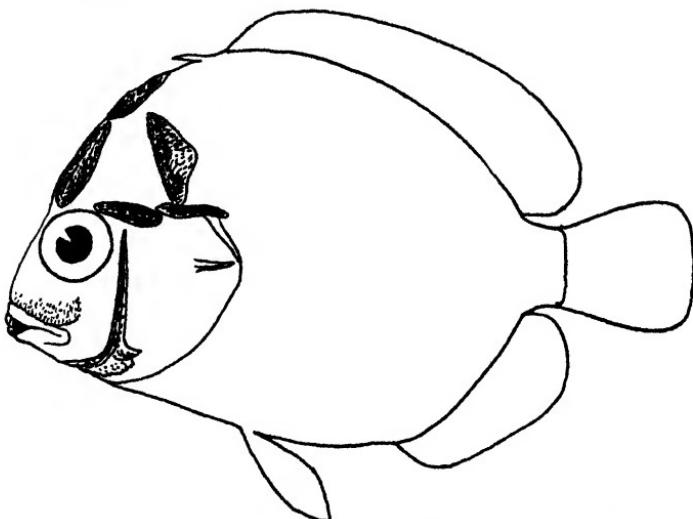


Fig. 2. *Tholichthys* stage of *Oplegnathus fasciatus* (Schlegel).

Family PLATYCEPHALIDAE

37. *Thysanophrys scaber* (L.)

One specimen 145 mm. long, from Hoihow, Hainan.

Family SOLEIDAE

38. *Cynoglossus puncticeps* Richardson

Three specimens from Pakhoi are 85 to 103 mm. in length, collected by W. E. Hoffmann.

39. *Solea ovata* Richardson

Seven specimens, 59 to 72 mm. in length, are from the Southwest Kwangtung Fisheries Experiment Station.

40. *Laeops lanceolata* Franz

Franz, Abh. Bayer Akad. Wiss., Suppl. IV, Abh. 1, p. 62, plate 8, fig. 60, 1910.

Norman, Flat Fishes, vol. I, p. 259, fig. 201, 1934.

An example 114 mm. long of this rare fish was obtained at Hoihow, Hainan (W. E. Hoffmann). Dorsal 102, the first two rays detached from the rest of the fin, none of the rays prolonged; anal 80. The depth is 3, the head almost 6 times in the length. The upper profile is a little more convex anteriorly than Norman's figure. The diameter of the eye is 2.85 times in the head, the length of the

pectoral 1.85 times. The caudal is pointed. The teeth are confined to the blind side of the jaws. A series of faint darker blotches along the upper margin of the body and extending upon the fin; my specimen is badly faded and does not show the blotches mentioned by other authors as occurring along the lower margin of the body. The outer portion of both dorsal and anal was evidently black in life.

Hitherto known only from the Japanese collections of Dr. Franz, and of Jordan and Yamamoto.

Family GOBIIDAE

41. *Creisson chinensis* (Osbeck)

Dorsal VI-1-10; anal 1-9; scales in longitudinal series 38-40, plus 5 or 6 smaller ones on caudal base, and 7 or 8 more very fine scales on the tail, extending for two-fifths its length; 13 scales in transverse series and 30 before the first dorsal. The scales on the posterior half are very large, those forward almost to pectoral angle much smaller, the rest very small and difficult to count. Nape, upper third of opercle, and upper end of preopercle covered with small scales.

The largest specimen has the depth 4.5 times in the length; the long and somewhat pointed caudal equals the head, 4 times in the length. The eye is 5.8, the snout 4 times in the head. The interorbital is 1.3 times in the eye. The oblique mouth extends to a vertical from the anterior part or middle of the eye; the tip of the tongue is rounded; the outer teeth of the upper jaw are large, stout, curved, caniniform; behind these are 3 rows of minute teeth; the lower jaw has 2 large canines, exposed when the mouth is closed; the outer row is of strong teeth of moderate size, with 3 rows of minute teeth behind.

Numerous short rows of sensory papillae run downwards from the eye; two longitudinal rows cross the preopercle, connected by numerous short rows; several short vertical rows behind the eye and a long row back to above the middle of the opercle, which also has transverse and longitudinal rows, as shown in the figure. The anal papilla is very long, slender, pointed, penis-like.

Three males, 62 to 104 mm. long, were obtained by Professor Hoffmann at Hoihow, Hainan. Five years in a metal container covered them with a thick deposit of rust, so that the color markings are not visible.

This species seems not to have been reported since Richardson's time. There is no question that it belongs to the genus *Creisson*, though it differs strongly in numerous ways from *Creisson validus*.

42. *Vaimosa piapensis* Herre

One specimen 30 mm. long, from Lantau Island. This is a notable extension of the most wide-spread species of *Vaimosa*; known from the Philippines, Borneo, and the vicinity of Singapore.

43. *Ctenogobius (Amoya) brevirostris* (Günther)

A specimen 52 mm. long, from Hoihow. Dorsal VI-I-10; anal I-9; scales in longitudinal series 44; depth 5.77, head 4.1, and caudal 3 times in the length; the second dorsal spine elongate. There are 4 rows of teeth in the upper, and 3 in the lower jaw; the outer row above is much the largest, the outer row below about half as large, the rest all minute; canines in the middle of the lower jaw. As this specimen distinctly shows 4 rows of teeth above, my genus *Amoya* becomes a synonym of *Ctenogobius*, or at most merely a section of *Ctenogobius*.

44. *Ctenogobius henryi* n. sp. (fig. 3)

Dorsal VI-I-8; anal I-7 or 8; scales in longitudinal series 32 or 30, plus 1 on the caudal base, and 9 in transverse series; no predorsal scales, the head and nape entirely naked.

The depth is 5.5 to 6, the caudal and pectoral each 4.12 to 4.25, the head 3.6, the ventral 6.6 to 6.8 times in the length. The eye is 3.9 to 4.1, the snout 3.3 to 3.9, the postorbital part of the head 2 times in the head.

The dorsal profile of the plump rounded form is nearly horizontal to the second dorsal origin, the ventral profile slightly arched to the anal origin, both tapering from there to the caudal base. The head is somewhat conical, its breadth about 1.5, its depth 1.8 to 2

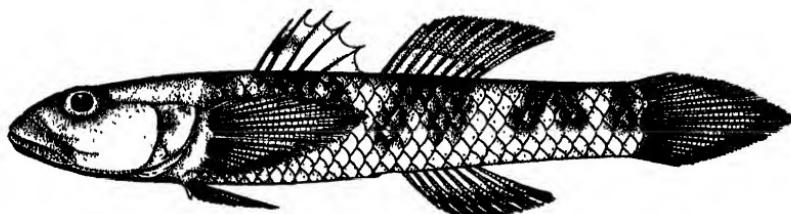


Fig. 3. *Ctenogobius henryi* Herre, new species.

times in its own length. The eyes are high up, projecting above the profile, close together, the interorbital 4.8 to 5 times in the eye. The snout is convex, the lips even, the mouth horizontal, large; in females the maxillary extends to a vertical from the front rim of the eye, 3.3 to 3.9 in the head; in males it extends to the middle of the eye or farther, and is 1.5 to 2 times in the head. The teeth are in 4 rows above, the outer row enlarged; in the lower jaw the outer row is much larger than the corresponding one above; behind it is a row of small teeth, followed by a row of moderately large slender teeth; no canines.

The pointed pectoral equals the somewhat pointed caudal and reaches to, or nearly to the vent; the first dorsal is low, its projecting filiform tips not reaching the second dorsal, its longest ray 2.35

times in the head; the low second dorsal and anal are of equal height, falling far short of the caudal when depressed, about 1.9 times in the head. The ventral is short, its tip reaching about half way to the vent, 1.8 to 1.9 times in the head; the least depth of the caudal peduncle is 3 times in its own length. The distance from the snout tip to the first dorsal origin is greater than from the latter point to the caudal base.

The color in alcohol is uniform brown, with 5 broad darker or blackish cross-bands which are divided on the lower half of the body; the first is under the first dorsal, the last on the caudal base; a band over the nape is more or less vaguely visible; the pectoral has a pale base on which are two dark brown circular spots, the rest of the fin pale to dusky; in females the dorsals are clear, with several transverse rows of spots on the rays; in males the first dorsal has a black spot on the membrane between the first and second spines, and may have a spot between the second and third dorsal spines, behind which may be a dark brown transverse bar. The caudal is barred by numerous rows of brown spots, or may be uniformly dark, but always has a circular dark brown spot on the middle of its base; the anal in females is clear, with a broad dark brown sub-marginal band on the rays only, in males it is more or less dusky, with a submarginal dark brown band and a wide clear margin.

The type, a female 34 mm. long, one female paratype 27 mm. long, and 4 male paratypes 30 to 33 mm. long, were received from Prof. William E. Hoffmann. They were taken in 1929 from a clear stream with rocky bottom, at Mui-yen, Lung-Nga Mountain, Kwangtung Province (K. C. Yeung and K. S. Chan).

A male paratype 30 mm. long was collected by me in a clear gravelly mountain stream near Ting Wu Monastery, Kwangtung Province. This is the only specimen with 8 anal rays and 30 scales. In life the ground color was dusky gray, with dark markings as in the other specimens; as it lay amid the gravel its colors blended perfectly with the creek bottom. The pectoral base had but one well defined spot on its upper part. The color in alcohol is paler than in life, but the markings remain as before.

This species is close to *Ctenogobius duospilus* Herre, from New Territory, Hong Kong. *C. duospilus* is differentiated at sight by its 8 or 9 predorsal scales.

I take pleasure in naming this species for Dr. J. M. Henry, Provost of Lingnan University, Canton, in slight recognition of his continued interest in, and warm support of my studies of Chinese fishes.

45. *Ctenogobius myxodermus* Herre

A specimen of this slimy little goby was taken from a mountain pond between Chuk-ho Shan and T'ung Chun Tai Fau, Kwangtung; its length is 34 mm.

46. *Rhinogobius leavelli* (Herre)

Three specimens from Lung T'au Shan, Kwangtung Province, their lengths 27 to 34 mm.

Dorsal VI-1-7 or 8; anal 1-5 or 6; scales 30-32 in a longitudinal and 10 in a transverse series; predorsal scales 6. There is a black spot in the middle of the caudal base, rarely present in the original lot from Wuchow, Kwangsi Province. This species is very evidently an offshoot from *R. hadropterus* (Jordan & Snyder). Through a curious slip this was first described as a *Ctenogobius*.

47. *Stigmatogobius javanicus* (Bleeker)

Two specimens, 27 and 29 mm. long, taken from a ditch on the campus of Lingnan University, Canton, were determined by Dr. F. P. Koumans. If correct, as is most likely, this is a very unexpected addition to the fauna of China.

48. *Acanthogobius stigmthonus* Richardson

A specimen 85 mm. long from Naam Kong, Kwangtung Province.

49. *Parapocryptes serperaster* (Richardson)

Four specimens, 50 to 73 mm. in length, from Naam Kong, Kwangtung.

50. *Periophthalmus barbarus* (Linnaeus)

Two young specimens, 30 and 31 mm. long, from Lantau Island.

51. *Boleophthalmus chinensis* (Osbeck)

Three specimens from Hoihow, Hainan, their lengths 63-65 mm.

52. *Trypauchen vagina* (Bl. & Schn.)

A specimen 86 mm. long, from Hainan.

Family CALLIONYMIDAE

53. *Callionymus curvicornis* (Cuv. & Val.)

Two male specimens, 48 to 62 mm. in length, from Hoihow. The first three dorsal spines reach to the caudal base, the first spine 1.3 times in the total length; the caudal is elongate, 2.6 in the length; the last anal ray reaches beyond the caudal base; the last dorsal ray on the first third of the caudal, 2.7 to 3.4 in the total length.

Family AMMODYTIDAE

54. *Herklotina viridianguillilis* Fowler

Two specimens, 106 and 118 mm. in length, from Hoihow, Hainan. The smaller specimen is a female filled with eggs not quite ready to spawn. Dorsal 40-42; anal 15; scales in lateral line 112-114, plus 5 on the caudal base. Depth 9 to 9.3, the head 5 times in the length. Dorsal height 2 to 2.1 in the head.

Family OSTRACIIDAE

55. *Ostracion concatenateus* Bloch & Schneider

A specimen 60 mm. long was received from the Southwest Kwangtung Fisheries Experiment Station.

Family TETRAODONTIDAE

56. *Sphoeroides alboplumbeus* (Richardson)

Two specimens, each 60 mm. long, from Cheung Chau Island in Pearl River, Kwangtung Province.

57. *Tetraodon ocellatus* (Osbeck)

A specimen 125 mm. long, from the Southwest Kwangtung Fisheries Experiment Station; they are the variety *bimaculata*.

中國廣東省及海南之魚類小誌

海里著

美國加省士丹福大學

(摘要)

本文發表廣東及海南之魚類五十七種，分屬廿五科，中經描述為新種者有 *Sinohomaloptera hoffmanni* (Homalopteridae) 及 *Ctenogobius henryi* (鰕虎科) 二種，上述新種及 *Oplegnathus fasciatus* (Schlegel) 之 *Tholichthys stage* 則如圖所示。對於各品種體之長度與其採集之地點，皆有述及焉。

**COLEOPTERA AND HYMENOPTERA FROM KWANGTUNG
INCLUDING HAINAN ISLAND¹**

By WILLIAM E. HOFFMANN

Lingnan Natural History Survey and Museum, Lingnan University.

The present list refers primarily to two lots of insects, those collected in Canton and vicinity by Prof. C. W. Howard from 1917-1921 and those collected in Hainan by the Lingnan University Fifth Hainan Island Expedition, 1929². Aside from the desirability of making available as soon as possible information on the insect fauna of the province, there are several reasons for publishing this list at the present time and in the present form¹. We wish to give credit to the late C. W. Howard for the excellent pioneer work he did in collecting insects and sending them away to specialists for determination. We wish, in like manner, also to give credit to the specialists who undertook the determinations. The list indicates specimens which are in the university collection and such information is useful for exchanges and for other purposes. In view of the present disturbed conditions in the country the extension of our knowledge of its fauna may be not only greatly interrupted but much work already accomplished may be lost. Collections may deteriorate or even be destroyed and unpublished records may be lost or destroyed or the investigators killed, but published information cannot be destroyed. Furthermore, preliminary information made available now may be more useful than more complete and accurate information made available at a much later period.

Some of the determinations were made twenty years ago and may require revision in the light of present knowledge. The responsibility for the family names under which the species are listed lies with the writer; for the most part Brues and Melander's "Classification of Insects" has been followed in the designation of families. In a number of cases it has been impossible to decipher the determination labels, many of which are in longhand; we have checked the names with such literature as is available in order to avoid errors. The writer, however, not the identifiers, should be held responsible for such errors as may occur. An attempt will be made to make corrections as some future date.

The determinations were, for the most part, made by the following: Coccinellidae by F. W. Nunnenmacher; Curculionidae by the U.S. National Museum and G. E. Bryant; the remainder of the beetles by G. J. Arrow; Formicidae by the late W. M. Wheeler;

¹ Contribution from the Lingnan Natural History Survey and Museum.

² This expedition was made possible by funds contributed by the China Foundation for the Promotion of Education and Culture.

Bombidae by T. C. Ma; Braconidae, Callimonidae, and Eucharididae by C. F. W. Muesebeck; Ichneumonidae by R. A. Cushman; Apidae, Megachilidae, and Podaliriidae by S. A. Rohwer; Chrysidae, Sphecidae, and Vespidae by O. Piel; Xylocopidae by T. C. Ma and J. Sonan.

The present list contains 206 species representing 34 families.

C O L E O P T E R A

CARABIDAE

Callida splendida F.

Honam I., Canton, April 8, 1918, C. W. Howard.

Galerita peregrina Dohm.

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

Partileus sinicus Hope

Honam I., Canton, May 18, 1919, C. W. Howard; no data.

Pheropsophus marginicollis Mots.

No data but probably Canton, C. W. Howard

Stenolophus smaragdulus F.

Without label, but known to have been collected in Canton by C. W. Howard prior to March 1920.

Trigonotoma dohrnii Chaudoir

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

CETONIIDAE

Agestrata orichalcea Linnaeus

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

Protaetia speculifera Swartz

Canton, prior to 1920, C. W. Howard.

Oxycetonia jucunda Faldermann var. **Kuperi** Sch.

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

Rhomorrhina resplendens Swartz

Honam I., Canton, June 18, 1918, C. W. Howard.

CICINDELIDAE

Cicindela aurulenta Fabricius

White Cloud Mt., Canton, July 28, 1919, C. W. Howard.

COCCINELLIDAE

***Caria dilatata* Fabricius**

Honam I., Canton, 1918, C. W. Howard; Hok Shan, Jan. 26, 1918; Nam Tin, April 3, 1921.

***Chilocorus nigritus* Fabricius**

Fati, near Canton, June 28, 1921, on mulberry, C. W. Howard.

***Chilomenes quadriplagiata* Swartz**

Canton Christian College (now Lingnan University), May 29, 1918, on beans, C. W. Howard; Tak Hing, Aug. 3, 1920, C. W. Howard; Honam I., Canton, Nov. 27, 1920, C. W. Howard; Canton, "3-18," Shek Lung, July 21, 1921; Fati, Canton, June 27, 1921, on mulberry, C. W. Howard.

***Chilomenes quadriplagiata* Swartz var.**

Tak Hing, Aug. 5, 1920, C. W. Howard.

***Coccinella repanda* Thunberg**

Canton, "3-18"; Honam I., Canton, Mar. 17, Nov. 1, and Nov. 27, C. W. Howard.

***Coelophora approximans* Cr.**

Fati, Canton, June 28, 1921, on mulberry, C. W. Howard; Sai Chiu, July 4-7, 1921, on mulberry, C. W. Howard.

***Coelophora congener* Schonh.**

Siu Laam and Yung Kei, June 22 & 23, 1921, on mulberry, C. W. Howard; Fati, Canton, June 27, 1921, on mulberry, C. W. Howard; Sai Chiu, July 8, 1921, on mulberry, C. W. Howard.

***Coelophora materis* Blackb.**

Fati, Canton, June 27, 1921, on mulberry, C. W. Howard.

***Coelophora saucia* Mulsant**

Canton, "4-19"; Honam I., Canton, Sept. 28, 1918; Honam I., Canton, March 17, July 24, & Sept. 1, 1920, C. W. Howard; Tak Hing, Aug. 5, 1920, C. W. Howard.

***Epilachna niponica* Lew.**

Honam I., Canton, June 6 and Dec. 10, 1920, C. W. Howard.

***Epilachna 28-punctata* Fabricius**

Honam I., Canton, April 13, 1918, on beans, C. W. Howard. "The beetles work on the underside of the leaves and eat off the lower epidermis. They have a strong odor and exude a yellow fluid when handled which colors fingers. Eggs laid on underside of leaves in clumps of 8 to 32 in number. Eggs yellow in color and spindle-

shaped, standing on end close together. May 1, 1918, eggs dried up." —C. W. Howard. Loh Fung Monastery, Loh Kong Tung, April 10, 1919, C. W. Howard.

A paper on the bionomics of this species was published in *Ling. Sci. Jour.* 6(4):301-311, 4 tab., 2 pl., 1928[1930].

Halyzia albolineata Gyllenhal

Canton, Nov. 18, 1917, C. W. Howard, Honam I., Canton, Nov. 27, 1920, C. W. Howard.

Ptychanatis axyridis (Pallas)

This may now be placed in the genus *Leis* Mulsant. Canton, "3-19"; Honam I., Canton, Aug. 4, 1919, C. W. Howard; Tak Hing, Aug. 8, 1920, C. W. Howard

Ptychanatis axyridis (Pallas) var.

Tak Hing, Aug. 5, 1920, C. W. Howard.

Rodolia rubea Mulsant

Honam I., June, 6, 1920, C. W. Howard.

Synonycha grandis (Thunberg)

Honam I., Canton, 1918; Honam I., Canton, Nov. 5 & Dec. 8, 1919, C. W. Howard; Honam I., Canton, Mar. 17, 1920, C. W. Howard; Canton Christian College (now Lingnan University), Canton, Nov. 3, 1921, C. W. Howard.

Thea cincta (Fabricius)

Honam I., Canton, Nov. 27, 1920, C. W. Howard; Sai Chiu, July 4-7, 1921, on mulberry, C. W. Howard; Shek Lung, July 21, 1921, C. W. Howard.

Verania discolor (Fabricius)

I believe this species is the one placed by some in the genus *Alesia* Mulsant. Canton Christian College (now Lingnan University) May 29, 1918, on beans, C. W. Howard; Canton, "7-18" (probably means July 1918), C. W. Howard; Tak Hing, Aug. 5, 1920, C. W. Howard; Honam I., Canton, Oct. 18, and Nov. 25, 1920, C. W. Howard; Fati, Canton, June 28, 1921, on mulberry, C. W. Howard. Sai Chiu, July 4-7, 1921, on mulberry, C. W. Howard.

Vibidia 12-guttata Mulsant

Sai Chiu, July 4-7, 1921, on mulberry, C. W. Howard.

CURCULIONIDAE

Apoderus Olivier (sens. lat.) sp.

Hainan I., Nam Cha Chuen, 3.3 mi. SW. of Nodoa, July 6, 1929, Lingnan University Fifth Hainan Island Expedition.

Centrocorynus maculipennis Voss

Hainan I., S. of Nodoa, June 25, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., Nam Cha Chuen, SW. of Nodoa, July 8, 1929. Lingnan University Fifth Hainan Island Expedition; Hainan I., grove nr. Beggar Village, SW. of Nodoa, July 9, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., grove 1 mi. N. of Nodoa, July 11, 1929, Lingnan University Fifth H. I. Exped.

Cyrtotrachelus longimanus F.

Without data; Honam I., Canton, May 4, 1918, and June 1, 1919, C. W. Howard. Honam I., June 26, 1929; Canton, China, 1931-1932, K. C. Maack (2)³; Shiu-Chow, K'uh Kiang Dist., Aug. 15, 1932, Y. W. Djou; Hainan I., S. China, enroute Nodoa to Naam Fung (10 mi.), Tan-hsien (Dist.), June 23, 1932, O. K. Lau & F. K. To. Hainan I., S. China, Hau-ying-ts'u'en, 6 mi. SE. of Nodoa, Lin-kao Dist., July 31, 1932, F. K. To. Hainan I., S. China, Hau-ying-ts'u'en, 6 mi. SE. of Nodoa, Lin-kao Dist., Aug. 4-6, 8-9, 1932, F. K. To. Hainan I., S. China, Nai-suen, 21 mi. SE. of Naan-fung, Lin-kao Dist. Sept. 5-6, 1932, F. K. To. Fukien, S. China, Kuliang, Foochow, Minhow Dist., July 6-29, 1932, S. B. Tang (2); Fukien, S. China, Ku Shan Foochow, Minhow Dist., Aug. 11, 1932, S. B. Tang. Fukien, S. China, Kuliang, Foochow, Minhow Dist., Aug. 28, Sept. 2, 1932, S. B. Tang (3); Canton, spring 1933, P. P. Hoh; Canton, China, Honam I., Mar. 1, 1933, W. E. Hoffmann (2); Honam I., March 31, May 1, 4, 15, 23, 27, June 1, 16, 1933, W. E. Hoffmann; Canton, China, Honam I., June 15, 1933, W. E. Hoffmann. Canton, China, Honam I., June 17, 1933, W. E. Hoffmann. Canton, China, Honam I., June 20, 1933, W. E. Hoffmann (2); Canton, China, Honam I., May 27, 1933, W. E. Hoffmann. Canton, June 27, 1933, W. E. Hoffmann; Honam I., Aug. 7, 1933, H. Y. Chan; Hainan I., South China, Kam-liu-tin, Lam-wan-tung, (Loi territory), Kiung shan District, July 29-30, 1933, F. K. To. Yuet Loi Hui, Mei Dist., July 30-31, 1933, F. K. To. Kwangtung, S. China, Nam Shan San Po, 30 li W. of Yuet Loi, Mei-hsien (Dist.), Aug. 2, 1933, F. K. To. Kwangtung, S. China, Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei-hsien (Dist.), Aug. 4-6, 1933, F. K. To. Kwangtung, S. China, San Po Hui, about 30 li W. of Yuet Loi, Mei Dist.; Aug. 7-9, 1933, F. K. To. Kwangtung, S. China, Yam Na Shan, 50 li SE. E. of Ping Chuen, Mei-hsien (Dist.) Sept. 13-18, 1933, F. K. To. Kwangtung, Yam Na Shan, 50 li SE. E. of Ping Chuen, Mei Dist., Aug. 30-31, Sept. 13-18 & 19-21, 1933, F. K. To; Tsing Leung Shan, 40 li S. of Sai Yeung, Mei Dist., Sept. 25-30, 1933; Kwangtung, S. China, Mo Tsz Tsai, Mei-hsien (Dist.), Nov. 16, 1933, F. K. To. Kwangtung, S. China, Lin Wa Toi, Lantau I., (nr. Hong Kong), Aug. 11, 1934, Y. W. Djou. Kwangtung, S. China, Wong-ngau-tsi,

³ The figure in parentheses following the name of the collector refers to the number of specimens bearing that locality label.

Lin-hsien (Dist.), Aug. 15, 1934, F K. To (2); Kwangtung, S. China, Iu-ling-paai, Taoshan, Lin-hsien (District), Sept. 17-18, 1934, F. K. To. Kwangtung, S. China, Naam-koung-paai, Yaoshan (Mt. range), Yang-shan Dist., Nov. 4-5, 1934, F. K. To. Hong Kong, Barker Rd., Victoria, Aug. 6, 1934, Y. W. Djou; Lin Wa Toi, Lantau I., (nr. Hong Kong), Aug. 10, 11, 12, 1934, Y. W. Djou; Tung Chung, Lantau I., (nr. Hong Kong), Aug. 16-19, 1934, Y. W. Djou; Canton, South China, Honam I., P'an-yu District, May 31, 1935, W. E. Hoffmann. Honam I., Canton, June 8, 1935, Y. C. Ng; Honam I., Canton, May 22 & June 15, 1935, W. E. Hoffmann. Loh Fau Shan, Wa Shau Toi, etc., June 2, 1935, E. R. Tinkham. Hainan I., South China, Uen-moon-tung, 29 mi. south of Fan-ta Village in Ting-an District., July 14-15, 1935, F. K. To. Kwangtung, S. China, Tai-wa-tszi, 5 mi. NW., of Ts'ing-yuen city, Ts'ing-yuen Dist., July 28-29, 1935, Chauncey W. Brownell (2); Hainan I., Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (Mt. range), Kiungshan Dist., May 21-22, 29, 1935, F. K. To; Honam I., June 1936, W. E. Hoffmann; Loh Fau Shan, Wa Shau T'oi, 900 ft., July 20, 1936, E. R. Tinkham.

A paper was published on the life history of this species in *Ling. Sci. Jour.* 6(4): 353-364, 2 pl., 1928 [1930].

***Euops* sp.**

Hainan I., grove 1 mi. N. of Nodoa, July 11, 1929, Lingnan University Fifth Hainan Island Expedition.

***Euops* sp.**

Hainan I., grove 2 mi. SW. of Nodoa, June 28, 1929, Lingnan University Fifth Hainan Island Expedition.

***Hoplapoderus gemmatus* (Thunberg) 1784**

Hainan I., Nodoa, June 24, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., S. of Nodoa, June 25, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., 2 mi. S. of Nodoa, June 26, 1929, Lingnan University Fifth Hainan Island Exped.; Hainan I., Nam Cha Chuen, SW. of Nodoa, July 8, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., grove near Beggar Village, SW. of Nodoa, July 9, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., grove 1.5 mi. S. of Nodoa, July 13, 1929, Lingnan University Fifth Hainan Island Expedition.

***Hoplapoderus hystrix* Fabricius**

Hainan I., S. of Nodoa, June 25 & July 12, 1929, Lingnan University Fifth Hainan Island Expedition.

***Lamprolabus* sp.**

Hainan I., S. of Nodoa, June 25, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., S. of Nodoa, July 12, 1929, Lingnan University Fifth Hainan Island Expedition.

Rhynchophorus ferrugineus Olivier

We have already (*Ling. Sci. Jour.* 16(4):637) recorded this species from one locality in Hainan. Further records from this island are as follows: Ka-chek, K'itung-tung Dist., May 3-6, 1932, W. E. Hoffmann; same locality, May 1932, F. K. To.

Subfamily Rhynchitinae

Hainan I., groves SE. of Nodoa, Aug. 20, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., Chue Mo Ling, NE. of Nodoa, Aug. 24, 1929, Lingnan University Fifth Hainan Island Expedition.

Subfamily Rhynchitinae

Hainan I., Chue Mo Ling, NE. of Nodoa, Aug. 24, 1929, Lingnan University Fifth Hainan Island Expedition.

DYNASTIDAE**Xylotrupes gideon** Linnaeus

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

DYTISCIDAE**Cybister tripunctatus** Olivier

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

Eretes sticticus Linnaeus

Honam I., Canton, July 24, 1919, C. W. Howard.

Sandracotius fasciatus Aubé.

Without label, but known to have been collected in Canton by C. W. Howard prior to March 1920.

LAMPYRIDAE**Luciola chinensis** Linnaeus

Honam I., Canton, April 24, 1918, C. W. Howard.

Pyrocoelia foochowensis Goth.

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

Vesta saturnalis Goth.

Ting-wu Shan, April 26, 1918, C. W. Howard.

LUCANIDAE**Neolucanus swinhoci** Bates

Canton, prior to 1920, C. W. Howard.

MELOLONTIDAE***Melolontha serrulata* Gyllenhal**

Without label, but known to have been collected by C. W. Howard prior to March 1920.

RUTELIDAE***Anomala antiqua* Gyll.**

Honam I., Canton, May 29, 1918, C. W. Howard.

***Anomala aulax* Wiedemann**

Honam I., Canton, April 19, 1918, C. W. Howard.

***Anomala cupripes* Hope**

Without label, but known to have been collected in Canton by C. W. Howard prior to March 1920.

***Anomala dalmani* Gyll.**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

***Anomala varicolor* Gyll.**

Honam I., Canton, May 1, 1918, C. W. Howard.

***Mimela splendens* Gyllenhal**

Loh Fung Monastery, Loh Kong Tung, April 9 & 10, 1919, C. W. Howard.

***Popillia histervidea* Gyll.**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

***Popillia mutans* Newm.**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

SCARABAEIDAE***Brahmina cylindricus* Gyll.**

Without label, but known to have been collected in Canton by C. W. Howard prior to March 1920.

***Catharsius molossus* Linnaeus**

Canton, prior to 1920, C. W. Howard.

***Copris sinicus* Hope**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

***Gymnopleurus sinuatus* Olivier**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

***Helicoprism bucephalus* Fabricius**

Collected at Canton prior to 1920 by C. W. Howard.

***Onthophagus seniculus* Fabricius**

Without label, but known to have been collected by C. W. Howard in Canton prior to March 1920.

H Y M E N O P T E R A**AMPULICIDAE*****Ampulex (Rhinopsis) consimilis* Kohl.**

Hong Kong, July 1926, W. E. Hoffmann.

APIDAE***Apis indica* Fabricius**

Canton, Nov. 24, & Dec. 15, 1920, C. W. Howard; Canton, C. W. Howard; White Cloud Mt., Canton, Nov. 8 & 19, 1920, C. W. Howard; Honam I., Canton, Nov. 15, 1920; Tak Hing, Canton, Aug. 5, 1920, C. W. Howard.

***Nomia thoracica* Smith**

Honam I., Canton, Sept. 20, 1920, C. W. Howard.

BOMBIDAE***Bombus atripes* F. Smith**

Yaoshan (Mt. range), Lien Dist., Apr. 24-26, 1934, F. K. To; Lung Ping Hui, Lien Dist., May 15, 1934, F. K. To; Linchow, Lien Dist., Aug. 12, 1934, F. K. To; Sheung-shui-heung, Lien Dist., Sept. 9-10, 1934, F. K. To; Wong-ngau-tsi, Lien Dist., Aug. 15, 1934, F. K. To.

HUPEH PROV., Si Tau Tsz (Mt.), Hwang-mei Dist., Aug. 8-12, 1933, Y. W. Djou.

***Bombus eximius* var. *detritus* (Friese)**

Yaoshan (Mt. range), Lien Dist., Apr. 24-26, 1934, F. K. To; Tai-ping, about 50 li NW.-W. of Mui Yuen, Mei Dist., Oct. 26, 1933, F. K. To; Naam-kong-paai, Yaoshan (Mt. range), Yang-shan Dist., Nov. 4-5, 1934, F. K. To. Loh Fau Shan, Bird Gorge, 3400-3800 ft., Oct. 15, 1934, Y. W. Djou; Loh Fau Shan, Big Pool, about 2800 ft., Aug. 2, 1933 & July 22, 1935, E. R. Tinkham.

***Bombus eximius* var. *segmentarius* (Friese)**

Ting Wu Shan, Kao-yao Dist., Apr. 6-7, 1934, E. R. Tinkham; Yaoshan (Mt. range), Lien Dist., Apr. 24-26, & May 4-5, 1934, F. K. To.

FUKIEN PROV., Cha-shan, Kien-ning Dist., June 10-17, 1933, D. C. Ngu.

Bombus eximius var. **tonkinensis** (Friese)

Yaoshan (Mt. range), Lien Dist., Apr. 24-26, 1934, F. K. To.

Bombus eximius var.

Yaoshan (Mt. range), Lien Dist., Apr. 24-26 & May 9-10, 1933, F. K. To.

FUKIEN PROV., Cha-shan, Kien-ning Dist., June 10-17, 1933, D. C. Ngu.

Bombus kulingensis Cockerell var.

Loh Fau Shan, Big Pool, elevation about 2600 ft., Aug. 8, 1933, E. R. Tinkham; Taam Yuen Tung, Lien Dist., June 15-19, 1934, F. K. To.

Bombus rufocognitus var. **nefandus** Cockerell

Yan Na Shan, about 50 li SE.-E. of Ping Chuen, Mei Dist., Aug. 24-28, and Sept. 1-5, 1933, F. K. To; Tsing Leung Shan, 12 mi. S. of Sai Yeung, Mei Dist., Oct. 6-11, 1933, F. K. To; Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei Dist., July 30-31, 1933, F. K. To; Linchow, Lien Dist., Aug. 7-8, 1934, F. K. To.

Bombus trifasciatus Sm.

Naam-kong-paai, Yaoshan (Mt. range), Yang-shan Dist., Oct. 18-20, 23-26, and 29-30, and Nov. 9-10, 1934, F. K. To.

HONAN PROV., Kikungshan, August 1936, W. E. Hoffmann.

BRACONIDAE**Disophrys** sp.

Hainan I., 2 mi. S. of Nodoa, June 25, 1929, Lingnan University Fifth Hainan Expedition.

Euagathis semiflavus Szep.

Hainan I., Nam Cha Chuen, 3.3 mi. SW. of Nodoa, July 6, 1929, Lingnan University Fifth Hainan Island Expedition.

Euagathis variabilis Enderlein

Hainan I., gr. 2 mi. SW. of Nodoa, June 28, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., Woh Hau Chuen, E. of Nodoa, July 3, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., gr. nr. Hoi Man Chuen, SW. of Nodoa, July 4, 1929, Lingnan University Fifth Hainan Island Expedition.

Fornicia sp.

Shiu-hing, Canton, Aug. 1, 1921.

Iphiaulax stramineus Cam.

Hainan I., Nam Cha Chuen, 3.3 mi. SW. of Nodoa, July 6, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., gr. 2 mi. SW. of Nodoa, June 28, 1929, Lingnan University Fifth Hainan Island Expedition.

Microbracon sp.

Hainan I., gr. 1.5 mi. S. of Nodoa, June 27, 1929, Lingnan University Fifth Hainan Expedition.

CALLIMOMIDAE**Podagrion greeni** Crawford?

Hainan I., Nam Cha Chuen, SW. of Nodoa, July 8, 1929, Lingnan University Fifth Hainan Island Expedition.

CERCERIDAE**Cerceris** sp.

Canton, Sept. 18, 1930, visiting flowers of pigeon pea.

Cerceris sp

Honam I., Canton, Sept. 15, 1931.

CHYSIDIDAE**Chrysis (Tetrachrysis) fuscipennis** Broc

Canton, Sept. 5, 1931, on cucurbits, staff.

Chrysis (Hexachrysis) principalis Tm.

Canton, Sept. 4, 1931, W. E. Hoffmann.

Chrysis sp.

• Canton, Sept. 18, 1930, visiting flowers of pigeon pea.

Stilbum cyanurum Forst.

No data.

CRABRONIDAE**Crabro** sp.

Canton, April 19, 1928, Hon Iu Huen.

EVANIIDAE**Evania appendigaster?**

Honam I., Canton, Oct. 7, 1931.

EUCHARIDIDAE**Schizaspidia** sp.

Hainan I., Lin Fa Ling (Mt.) nr. Nodoa, Aug. 8, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., N. of Nodoa, Aug. 15, 1929, Lingnan University Fifth Hainan Island Expedition.

FORMICIDAE**Camponotus mitis** F. Smith

Canton, C. W. Howard.

Camponotus nicobarensis Mayr

Canton, C. W. Howard; Honam Island, Canton, C. W. Howard.

Camponotus rufoglaucus Jerdon subsp. **paria** Emery

Canton, C. W. Howard; Fei-loi Monastery, Nov. 4, 1919, C. W. Howard.

Camponotus taylori Forel var. **albosparsus** Forel

Canton, C. W. Howard.

Cardicondyla nuda Mayr

Canton, C. W. Howard.

Cremastogaster rogenhoferi Mayr

Canton, C. W. Howard.

Diacamma rugosum Le Guillou subsp. **geometricum** F. Smith var. **anceps** Emery

Canton, C. W. Howard; White Cloud Mt., Nov. 11, 1920, C. W. Howard.

Dolichoderus affinis Emery var. **nigricans** Emery

Loh Kong Tung, January 1920, attending aphids, C. W. Howard.

Dolichoderus taprobanae F. Smith var. **gracilipes** Mayr

Canton, C. W. Howard.

Iridomyrmex anceps Roger

Canton, C. W. Howard.

Leptogenys diminuta Smith

Ting-wu Shan, C. W. Howard.

Monomorium carbonarium F. Smith

Canton, C. W. Howard.

Monomorium pharaonis Linnaeus

Canton, C. W. Howard.

Odontoponera transversa F. Smith

Honam Island, Canton, C. W. Howard.

Oecophylla smaragdina Fabricius

Sun Wui Dist., C. W. Howard.

Paratrechina longicornis Latreille

Canton, C. W. Howard.

Pheidolegeton diversus (Jerdon)

Canton, C. W. Howard; Fei-loi Monastery, C. W. Howard.

Plagiolepis longipes Jerdon

Canton, C. W. Howard.

Plagiolepis rothneyi Forel

Canton, C. W. Howard.

Polyrhachis daves F. Smith

Canton, C. W. Howard.

Polyrhachis mayri Roger

Canton, C. W. Howard.

Polyrhachis rastellata F. Smith subsp. **laevior** Roger var. **debilis**

Emery

Canton, C. W. Howard.

Prenolepis yerburyi Forel var.

Canton, C. W. Howard.

Stictoponera menadensis Mayr subsp. **bicolor** Emery

Ting-wu Shan, C. W. Howard.

Tapinoma indicum Forel

Ting-wu Shan, C. W. Howard.

Technomyrmex albipes F. SmithCanton, Jan. 11, 1918, attending Mealy-bugs on *Hibiscus*, C. W. Howard.**Tetraponera allaborans** Walker

Honam Island, Canton, Nov. 13, 1918, C. W. Howard.

ICHNEUMONIDAE**Agrypon** sp.

Hainan I., gr. nr. Hoi Man Chuen, SW. of Nodoa, July 1, 1929, Lingnan University Fifth Hainan Island Expedition

Amblyteles sp.

Canton, C. W. Howard.

Amblyteles sp.

Canton, Sept. 1, 1920, C. W. Howard.

Enicospilus analis Mots & Uchida

Hainan I., Man Fook Chuen, S. of Nodoa, July 19, 1929, Lingnan University Fifth Hainan Island Expedition.

Ephialtes parnarae (Vierick)

Honam I., Canton, Nov. 18, 1920, C. W. Howard.

Henicosipilus (=Enicospilus) merdarius Gravenhorst

White Cloud Mt., Canton, Nov. 23, 1920, C. W. Howard.

Idechthis sp.

Canton, May 7, 1920, C. W. Howard.

Idechthis sp.

Canton, May 7, 1920, C. W. Howard.

Mesostenidea (= **Mesostenus**) sp.

Honam I., Sept. 15, 1920, C. W. Howard.

Mesostenus sp.

Hainan I., Mei Foo Chuen, nr. Nodoa, Aug. 13, 1929, Lingnan University Fifth Hainan Island Expedition; Hainan I., on trail, Poh Shaang to Yuen Moon, July 28, 1929, Lingnan University Fifth Hainan Island Expedition.

Paniscus testaceus Gravenhorst

Canton, C. W. Howard.

Stauropoctonus orientalis Morley

Hainan I., Chue Mo Ling, N.E. of Nodoa, Aug. 24, 1929, Lingnan University Fifth Hainan Island Expedition.

Trogus sp.

Hainan I., gr. 2 mi. SW. of Nodoa, June 28, 1929, Lingnan University Fifth Hainan Island Expedition.

Xanthopimpla pedator (Fabricius)

White Cloud Mt., Canton, June 9, 1919, C. W. Howard; White Cloud Mt., Canton, Nov. 19, 1920, C. W. Howard; Canton, C. W. Howard.

Xanthopimpla punctata (Fabricius)

White Cloud Mt., Canton, Nov. 16, 1920, C. W. Howard; Sha Kong, Canton, Oct. 25, 1920, C. W. Howard.

Xanthopimpla sp.

Honam I., Canton, Sept. 19, 1931.

Xanthopimpla sp.

Honam I., Canton, Oct. 7, 1931, staff.

Xanthopimpla sp.

Honam I., Canton, Sept. 21, 1931.

Xanthopimpla sp.

No data.

Xanthopimpla sp.

Canton, 1932, K. Y. Chan.

Xanthopimpla sp.

No data.

Xanthopimpla sp.

No data.

LARRIDAE**Larra** sp.

Canton, summer of 1927, staff.

Liris aurata Fabricius

Canton, summer of 1928, W. E. Hoffmann; no data..

Tachysphex ?

Honam I., Canton, Sept. 25, 1931.

Tachytes modesta

Canton, Aug. 5, 1926; Canton, Aug. 5 & 10, 1926, W. E. Hoffmann; no data.

MEGACHILIDAE**Megachile disjunctiformis** Cockerell

Tak Hing, Canton, Aug. 5, 1920, C. W. Howard.

Megachile sp.

Honam I., Canton, Oct. 8, 1931.

Sphecodes sp.

Honam I., Canton, Sept. 25, 1931.

Sphecodes sp. ?

Honam I., Canton, Oct. 7, 1931, staff.

PODALIRIIDAE**Podalirius (=Anthophora) zonata** (Linnaeus)

Canton, May 25, 1920, C. W. Howard; Sha Kong, Sept. 25, 1920, C. W. Howard.

Podalirius (=Anthophora) sp.

Vicinity of Cheung Muk Tau, Kwangtung, Sept. 23, 1931.

♦ **Podalirius (=Anthophora)** sp.

Honam I., Canton, Oct. 8, 1931.

PSAMMOCHARIDAE (Prob.)**Balanodes analis** Fabricius

Canton, summer of 1926, W. E. Hoffmann; no data. ♀

SCELIONIDAE

Scelio sp.

Hainan I., Lin Fa Ling (Mt.), nr. Nodoa, Aug. 8, 1929, Lingnan University Fifth Hainan Island Expedition.

SCOLIIDAE

Campsomeris annulata (Fabricius)

Honam I., Canton, Nov. 27, 1925, W. E. Hoffmann; Honam I., Canton, Oct. 7, 1931, staff.

Campsomeris sp.

Honam I., Canton, Sept. 25, 1931.

Campsomeris sp.

Honam I., Canton, Sept. 21, 1931.

* SPHECIDAE

Ammophila sp.

White Cloud Mt., Canton, July 15, 1927, H. T. Chen.

Ammophila Kirby = **Sphex**

Lung Tau Shan, July 20, 1924.

Chlorion cyaneum Dahlbom

Honam I., Canton, June 14, 1926, I. M. Wan; University Campus, no data.

Chlorion umbrosus Christ

Canton, Aug. 5, 10, and 21, 1926, W. E. Hoffmann; Canton, Aug. 5, 1926; Canton, summer of 1927, staff: University Campus, Aug. 31, 1927, on flowers of Che Foo So, K. S. Chan; Shiuchow, Kwangtung, July 6, 1928, I. H. Hon; Honam I., Canton, Sept. 30, 1931, W. E. Hoffmann; no data; Honam I., Canton, Sept. 29, 1931, Honam I., Canton, Oct. 7, 1931, staff.

Sceliphron deformis Smith

Hong Kong, July 1926, W. E. Hoffmann.

Sceliphron (= **Chalybion**) ? **inflexum** Sichus

Canton, spring of 1928, I. H. Hon; Canton, 1932, K. Y. Chan; no data; Lung Tau Shan, July 10 & 30, 1924.

Sceliphron madraspatanum Fabricius

University Campus, July 19, 1927, H. T. Chen; University Campus, Aug. 13, 1927, K. S. Chan; Honam I., Canton, Sept. 6, 1927, on cucurbits, K. S. Chan; Sept. 18, 1930, on flowers of pigeon pea; Canton, Sept. 4, 1931, W. E. Hoffmann; Honam I., Canton, Oct. 8, 1931, Canton, 1932, K. Y. Chan.

Sceliphron (= Chalybion) violaceum Tiekm. (sp. ?)

Lung Tau Shan, July 20, 1924.

Sphex aurulentus F. var. **sericeus** F.

No data.

Sphex (Isodontia) nigripes Sm.

Canton, Aug. 10, 1926, W. E. Hoffmann; Canton, Aug. 6, 1926, Chu C. Chong; Canton, Sept. 18, 1930, visiting flowers of pigeon pea.

Sphex (= Ammophila) sp.

No data.

TRYPOXYLIDAE

Pison sp.

Canton, 1932, K. Y. Chan; Canton, Sept. 25, 1932.

Trypoxylon sp.

University Campus, Dec 2, 1930, on grass, Y. S. Chan; Canton, July 17, 1931, collected in bean field.

VESPIDAE

Eumenes arcuatus

Canton, Aug. 5, 1926, W. E. Hoffmann; University Campus, Aug. 4, 1927, H. T. Chen; University Campus, Aug. 13, 1927, K. S. Chan; Canton, summer of 1928, W. E. Hoffmann; Canton, from long nest; no data.

Eumenes campaniformis var.

Canton, Aug. 5 & 10, 1926, W. E. Hoffmann; Canton, summer of 1927, staff; Canton, Sept. 18, 1930, visiting flowers of pigeon pea; no data.

Eumenes campaniformis v. **esuriens**

Honam I., Canton, Nov. 27, 1925, W. E. Hoffmann.

Eumenes pyriformis F. (= **petiolata** F.)

Honam I., Canton, May 26, 1926, K. S. Pang; Canton, Aug. 5, 10, & 21, 1926, W. E. Hoffmann; Canton, summer of 1927, staff; University Campus, Aug. 31, 1927, on flowers of Che Foo So, K. S. Chan; Canton, April 10, 1928, Y. M. Leung; Canton, Dec. 4, 1929, K. L. Wong; no data.

Odynerus sp.

Honam I., Canton, April 12, 1926, K. C. Yeung; Canton, Aug. 10, 1926; Canton, Aug. 10, 1926, W. E. Hoffmann; Canton, Sept. 5, 1931; no data; Honam I., Canton, Sept. 19, 1931.

Odynerus sp. ?

Honam I., Canton, Sept. 15, 1931.

Parapolybia sp.

No data.

Parapolybia sp.

Canton, University Campus; no data.

Polistes hebraeus (Fabricius)

Canton, Oct. 28, 1920, C. W. Howard (det. Rohwer); White Cloud Mt., Canton, July 16, 1927, R. E. Wall; Honam I., Canton, Sept. 7, 1927, visiting wild flower, K. S. Chan; Honam I., Canton, Sept. 9, 1927, on cucurbits, K. S. Chan; Honam I., Canton, Sept. 19, 1927, on cucurbit leaf, K. S. Chan; no data.

Polistes japonicus Saussure

White Cloud Mt., Canton, July 15, 1927, H. T. Chen; Honam I., Canton, Sept. 7, 1927, visiting wild flower, K. S. Chan; Shiuchow, Kwangtung, July 5, 1928, K. Y. Wong; no data.

Polistes jocohammiae D. T.

Tungshan, Canton, July 23, 1927, K. S. Chan; University Campus, Aug. 2, 1927, on Hibiscus, H. T. Chen; University Campus, Aug. 5, 1927, K. S. Chan; University Campus, Aug. 6, 1927, K. S. Chan; Paak Hok Tung, Canton Aug. 18, 1927, on cucurbit leaf, K. S. Chan; Canton, April 6, 1928, K. L. Wong, Canton, April 7, 1928, Y. M. Leung; Canton, April 8, 10 & 12, 1928, K. Y. Wong; Canton, summer of 1928, W. E. Hoffmann; Honam I., Canton, Aug. 7, 1928, W. E. Hoffmann; Canton, Sept. 5, 1931; Honam I., Canton, autumn of 1932, W. E. Hoffmann; Canton, Nov. 1 & 9, 1932, W. E. Hoffmann; Canton, Nov. 9, 1932, in house, W. E. Hoffmann; Canton, 1932, K. Y. Chan; Canton, Ling. Nat. Hist. Surv. & Mus.; Canton, Nov. 12; University Campus, Canton, no date; without data.

Polistes ? megal Per.

Shiuchow, Kwangtung, July 5, 1928, K. Y. Wong.

Polistes orientalis

Canton, summer of 1927, staff; University Campus, Canton, July 11, 1927, K. S. Chan; Honam I., Canton, July 21, 1927, K. S. Chan; University Campus, Aug. 3, 1927, on Camphor tree, H. T. Chen; University Campus, Aug. 5, 1927, H. T. Chen; University Campus, Aug. 13, 1927, K. S. Chan; University Campus, Aug. 13, 1927, H. T. Chen; Canton, April 8, 1928, on peach, K. Y. Wong; Canton, April 10, 1928, K. L. Wong; Canton, April 13, 1928, on peach, K. Y. Wong; Canton, summer of 1928, W. E. Hoffmann; Canton, Sept. 25, 1931, W. E. Hoffmann; University Campus, September 1931, K.

Y. Chan; Canton, 1932, K. Y. Chan; Canton, Oct. 26, 1932, W. E. Hoffmann; Honam I., Canton, Oct. 28, 1932, Y. W. Djou.

Polistes sulcatus or confusus Sm.

University Campus, July 17, 1927, K. S. Chan; Canton, summer of 1927, R. E. Wall; University Campus, Sept. 23, 1927, K. S. Chan; no data.

Polistes sagittarius Saussure

University Campus, Canton, Aug. 23, 1927, H. T. Chen; Canton, April 9, 1928, Y. M. Leung; Canton, Sept. 25, 1931, W. E. Hoffmann; no data.

Polistes sp.

Plum Garden, Tseng-ch'eng, Kwangtung, Sept. 17, on *Broussonetia papyrifera* Vent; Honam I., Canton, Sept. 15, 1931, Mr. Chan.

Polistes sp.

White Cloud Mt., Canton, Sept. 19, 1931.

Polistes sp.

Honam I., Canton, Oct. 7, 1931, staff.

Ropalidia (= Icaria) sp

Shiuchow, Kwangtung, July 5 & 10, 1928, K. Y. Wong; Honam I., Canton, Sept. 11, 1931.

Rychium brunneum F.

Canton, Aug. 5, 1926; University Campus, Aug. 31, 1927, on flowers of the Che Foo So, K. S. Chan.

Rygchium haemorrhoidale var. brunneum

Honam I., Canton, April 26, 1926, K. C. Yeung; Canton, Aug. 5, 10 & 21, 1926, W. E. Hoffmann; Canton, summer of 1927, staff; University Campus, Aug. 6, 1927, K. S. Chan; Canton, Oct. 2, 1932, W. E. Hoffmann; no data.

Rygchium sp.

Canton, summer of 1926, W. E. Hoffmann; Canton, Aug. 5, 10, 21, 1926, W. E. Hoffmann; Canton, summer of 1927, staff; University Campus, Aug. 30, 1927, on Lin Kiu, K. S. Chan; Canton, summer of 1928, W. E. Hoffmann; no data.

Rygchium sp.

Canton, Aug. 5, 1926; Canton, summer of 1926, Aug. 5, 10, & 21, W. E. Hoffmann; University Campus, Aug. 23, 1927, H. T. Chen; no data.

Vespa bicolor Fabricius

Honam I., Canton, Sept. 19, 1927, on cucurbit leaf, K. S. Chan; Canton, April 7, 1928, Y. M. Leung; Canton, May 10, 1928, Hon Iu

Huen; University Campus on grass, Nov. 24, 1930, on citrus, Y. S. Chan; University Campus on grass, Dec. 2, 1930, Y. S. Chan; no data; label not legible; Honam I., Canton, Sept. 29, 1931. *

Vespa cineta Fabricius

Honam I., Canton, Sept. 7, 1927, visiting wild flower, K. S. Chan; University Campus, Sept. 23, 1927, K. S. Chan; Canton, May 10, 1928, Hon Iu Huen; Canton, summer of 1928, W. E. Hoffmann; Ng Chuen, Honam I., Canton, Sept. 13, 1929, K. F. Wong; Canton, Sept. 18, 1930, visiting flowers of pigeon pea; Sau Chue Kong, Honam I., Canton, Nov. 17, 1930, Y. S. Chan; Canton, Oct. 26, 1932, W. E. Hoffmann; no data.

Vespa cineta affinis Buyri (sp. ?)

Canton, Sept. 18, 1930, visiting flowers of pigeon pea; White Cloud Mt., Canton, May 1932, K. Y. Chan; Canton, Nov. 15; no data; Honam I., Canton, Sept. 15, 1931, Chan; Honam I., Canton, Oct. 7, 1931, staff.

Vespa sp.

Canton, summer of 1929, W. E. Hoffmann.

XYLOCOPIDAE

Xylocopa appendiculata F. Smith

Linchow, Lien Dist., Aug. 9 & 12, 1934, F. K. To; Yaoshan (Mt. range), Lien Dist., Apr. 24-26, 1934, F. K. To; Taam Yuen Tung, Lien Dist., May 25, 1934, F. K. To; Shui-chuk-t'ong, Sheung-shui-heung, Lien Dist., Aug. 20, 1934, F. K. To.

HUPEH PROV., Si Tsu Tsz (Mt.), Hwang-mei Dist., Aug. 8-12, 1933, Y. W. Djou.

HONAN PROV., Kikungshan, August, 1936, W. E. Hoffmann.

Xylocopa attenuata J. Perez

Loh Kong Tung, P'an-yu Dist., May 1932, K. Y. Chan; Canton, Honam I., April 15, 1933 & Apr. 17, 1935, W. E. Hoffmann; Canton, White Cloud Mountain, P'an-yu Dist., May 5, 1934, K. C. Yeung; Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei Dist., July 29, 1933, F. K. To; San Po Hui, about 30 li W. of Yuet Loi, Mei Dist., Aug. 11-15, 1933, F. K. To; Hainan Island, Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (Mt. range), Kiung-shan Dist., Apr. 20-24, 1935, F. K. To.

FUKIEN PROV., Cha-shan, Kien-ning Dist., June 1933, D. C. Ngu; Fukien Prov., Kuliang, Foochow, Minhow Dist., July 8-29, Aug. 25 to Sept. 2, 1932, S. B. Tang; Fukien Prov., Siong Po, Foochow, Minhow Dist., Aug. 6, 1932, S. B. Tang; Huai An, Foochow, Minhow Dist., Aug. 10, 1932, S. B. Tang.

HUPEH PROV., Hwang-mei, Hwang-mei Dist., June 18-19, 1935, H. W. Djou.

HONAN PROV., Kikungshan, Aug. 1936, W. E. Hoffmann.

Xylocopa caerulea (Fabr.)

Hainan Island, Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (Mt. range), Kiung-shan Dist., May 13-14, 1935, F. K. To; Hainan Island, Taai-pei, about 24 mi. from Naam-fung, Lin-kao Dist., Oct. 6-9, 1932, F. K. To; Hainan Island, Hau-ying-ts'uen, 6 mi. SE. of Nodoa, Lin-kao Dist., July 29-30, 1932, F. K. To.

Xylocopa chionothorax Cockerell

Honam I., Canton, Oct. 8, 1931; Canton, Honam I., Feb. 12, June 14, & Oct. 26, 1932, Apr. 15, 1933, W. E. Hoffmann; Canton, China, 1931-1932, F. Y. Lee; Canton, China, Honam I., April 7, 1933, Y. W. Djou; Lingnan University Campus, Canton, Aug 5 & Sept. 2, 1927, K. S. Chan; Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei Dist., July 29-31 & Aug. 4-6, 1933, F. K. To; Yam Na Shan, 50±1 li SE.-li. of Ping Chuen, Mei Dist., Aug. 30-31, Sept. 1-11 & 19-21, 1933, F. K. To; San Po Hui, about 30 li W. of Yuet Loi, Mei Dist., Aug. 11-15 & 19-21, 1933, F. K. To; Hainan Island, April 30, 1932, W. E. Hoffmann; Hainan Island, Nodoa, Tan Dist., June 1932, F. K. To; Hainan Island, Ngai-chau, Yai Dist., May 27-30, 1932, W. E. Hoffmann & O. K. Lau; Hainan Island, Naam-fung, 10 mi. S.-SW. of Nodoa, Tan Dist., June 24 & 27-30, 1932, O. K. Lau & F. K. To; Hainan Island, Ch'ung-Mei, 15 mi. SE. of Naam-fung, Lin-kao Dist., Aug. 24-26, 1932, F. K. To; Hongkong Island, elevation 500-800 ft., May 26, 1935, E. R. Tinkham.

FUKIEN PROV., Kuliang, Minhow Dist., July 6-29, 1932, S. B. Tang.

KWANGSI PROV., Taipingfu, Sung-shen Dist., Aug. 5-6, 1934, E. R. Tinkham.

Xylocopa collaris Lepeletier

Hainan Island, Nodoa, about 75 mi. SW. of Hoi-how, Tan Dist., June 17, 1932, O. K. Lau & F. K. To; Hainan Island, Yau-ma-woh, 3 mi. SW. of Nodoa, near foot of Sha-po-ling, Tan Dist., July 8-9, 1932, F. K. To; Hainan Island, Hau-ying-ts'uen, SE. of Nodoa, Lin-kao Dist., Aug. 4-6, 1932, F. K. To; Hainan Island, Tai-tsing-lam-ts'uen, back of Lai-mo-ling, (Mt. range), Ting-an Dist., June 22, 1935, F. K. To.

Xylocopa collaris var. *binghami* Cockerell

Hainan Island, Naam-fung, 10 mi. S.-SW. of Nodoa, Tan Dist., July 7, 1932, F. K. To; Hau-ying-ts'uen, 6 mi. SE. of Nodoa, Lin-kao Dist., July 27-31, and Aug. 1-3 & 4-6, 1932, F. K. To; Yau-ma-woh, 3 mi. SW. of Nodoa, near foot of Sha-po-ling, Tan Dist., July 8-9, 1932, F. K. To; Hainan Island, Tai-tsing-lam-ts'uen, back of Lai-mo-ling (Mt. range), Ting-an Dist., June 3-4, 1935, F. K. To.

Xylocopa dissimilis Lepeletier

The distribution of this species as indicated by specimens in our collection was given in *Ling. Sci. Jour.* 17(1):90, 1938.

Xylocopa sinensis Sm.

Yuet Loi Hui, about 40 li NW. of Ping Chuen, Mei Dist., July 29, 1933, F. K. To; Taam Yuen Tung, Lien Dist., May 28 & June 7, 1934, F. K. To; Yam Na Shan, about 15 li SE.-E. of Ping Chuen, Mei Dist., Aug. 30-31, 1933, F. K. To.

FUKIEN PROV.: Cha-shan, Kien-ning Dist., June 10-17, 1933, D. C. Ngu; Kuliang, Foochow, Minhow Dist., July 6-29 & Aug. 28-Sept. 2, 1932, S. B. Tang; Hung Sang Gio, Foochow, Minhow Dist., Aug. 9, 1932, S. B. Tang; Ku Shan, Foochow, Minhow Dist., Aug. 11, 1932, S. B. Tang.

HUPEH PROV.: Si Tsu tsz (Mt.), Hwang-mei Dist., Aug. 8-12, 1933, Y. W. Djou.

Species of which the Family Names are Unknown to Us**Campyloneurus** sp.

Hainan I., Nam Cha Chuen, 3.3 mi. SW. of Nodoa, July 5, 1929, Lingnan University Fifth Hainan Island Expedition.

Goryphus detritus Hgn.

Hainan I., gr. 2 mi. SW. of Nodoa, June 28, 1929, Lingnan University Fifth Hainan Island Expedition.

Isopteronotum taeniocauda Enderlein

Hainan I., Man Fook Chuen, S. of Nodoa, July 19, 1929, Lingnan University Fifth Hainan Island Expedition.

? Mansa tarsalis (Cam.)

Hainan I., Man Fook Chuen, S. of Nodoa, July 19, 1929, Lingnan University Fifth Hainan Island Expedition.

Skeatia varipes Cam.

* Hainan I., Chue Mo Ling, NE. of Nodoa, Aug. 24, 1929, Lingnan University Fifth Hainan Island Expedition.

廣東及海南島之鞘翅目與膜翅目昆蟲誌

賀輔民著

嶺南大學自然博物採集所

(摘要)

本名錄論及二百零六種，分隸三十四科。

**BUTTERFLIES FROM KWANGTUNG PROVINCE, INCLUDING
HAINAN ISLAND¹**

By Y. C. Ng (NG YUK-CHAU, 吴玉洲)

Lingnan Natural History Survey and Museum, Lingnan University.

The present paper contains a partial list of butterflies from Kwangtung Province including Hainan Island, collected from 1917-1937, by the Lingnan Natural History Survey and Museum (and the forerunner of this organization). The specimens are in the collection of the Lingnan Natural History Survey and Museum. Omitted from this list are those species which have been recently recorded in papers by members of the museum staff. These are:

1. Tinkham E. R. "Diurnal Lepidoptera from Loh Fau Shan, Lung T'au Shan and Yao Shan, Kwangtung, with a Description of a new subspecies". *Ling. Sci. Jour.* 15 (4): 557-568, 1 pl., 1936, and 16(1): 39-52, 1937 (122 species in 8 families).
2. Hoffmann, William E., Y. C. Ng, and H. W. Tsang. "Life History Studies in nine Families of Kwangtung Butterflies (Lepidoptera: Rhopalocera)". *Ling. Sci. Jour.* 17 (2): 227-246, 4 pl., 1938; 17(3): 407-424, 2 pl., 1938; 17(4): *in press* (40 species in 9 families).

The present list includes 169 species contained in 10 families. About one half (78 to be exact) of the species here listed were identified (for the late Prof. C. W. Howard) by Dr. W. Schaus during the years 1920-1922, the others have been determined by the writer. The species in this list together with those given in the above-mentioned papers make a total of 331 species which have been collected in the province by our organization, the specimens of which are in our collection.

DANAIDAE

Danaida grammica Bdv.

Danais chrysippus Linn.

Swatow, Ch'eng-hai District, Sept. 11, 1934, Y. C. Ng (2)²; Hainan I., Nam-po-ts'uen (Loi territory) Ch'eng-mai District, Sept. 1-3, 1935, F. K. To.

Danais limniace Cramer

Hong Kong I., near the Peak, May 21, 1934, E. R. Tinkham; Swatow, Ch'eng-hai District, Aug. 15, and Sept. 9, 1934, Y. C. Ng;

¹ Contribution from the Lingnan Natural History Survey and Museum

² The figure in parentheses following the name of the collector refers to the number of specimens bearing that locality label.

Hainan I., Nam-po-ts'uen (Loi territory), Ch'eng-mai District, Sept. 1-3, 1935, F. K. To.

Danais plexippus Linn.

Canton, Honam I., P'an-yu District, Nov. 16, 1930; Tung Chung, Lan-tau I. (near Hong Kong), August 16-19, 1934, Y. W. Djou; Hainan I., Hoihow, K'itung-shan District, 1932, William E. Hoffmann; Hainan I., Sam-kwong-ts'uen, Lam-wan-tung (Loi territory) Kiung-shan District, August 13-14, 1935, F. K. To; Kwangsi, Mts. 5 mi. S. of Lung-chow, Lung Cheu District, August 8, 1934, Ernest R. Tinkham.

Danais tytia Gray

Yunnan, Yunnanfu (West Hills alt. 6500-7500 ft.) August 21-22, 1934, and (West Hills alt. 7000-8000 ft.) Sept. 1, 1934, Ernest R. Tinkham.

Euploea dione Westwood

Canton, Honam I., June 18, 1933, E. R. Tinkham; Hong Kong, May 26, 1933, E. R. Tinkham.

Euploea godarti Lucas

Canton, Honam I., P'an-yu District, Nov. 8, 1935, F. K. To; Homun-shan, Tong-ka-wan, Chun-shan District, August 10, 1933, H. Y. Chan & K. C. Lee (2); Hainan I., Nam-ting-ts'uen (10 mi. N.E. of Sam-ah-kong), Yai-hsien District, Feb. 6, and 12-13, 1935, F. K. To; Hainan I., Loh-fung-tung, Yai-hsien District, Feb. 25, 1935, F. K. To.

Radena similis Linn.

SATYRIDAE

Aulocera merlina Oberthur

Yunnan, Shui Tang, (20 mi. E. of Yunnanfu), pine mts., alt. 6800-8000 ft., Aug. 28-29, 1934, Ernest R. Tinkham, (4); Yunnan, Shui Tang, Aug. 28, 1934, Ernest R. Tinkham, (3); Yunnan, Pi Shit Chai, Sept. 6, 1934, Ernest R. Tinkham, (2); Yunnan, (West Hills, alt. 7000-8000 ft.) Sept. 1, 1934, Ernest R. Tinkham.

Elymnias tonkiniana Fruhst.

Erebia rurigena Leech

Yunnan, An Ning Djou, Sept. 4, 1934, Ernest R. Tinkham, (2); Yunnan, Yunnanfu, (West Hills, alt. 6500-7500 ft.) August 21-22, 1934, Ernest R. Tinkham, (2).

Lethe coelestis Leech

Lethe gambara Fruhst.

Lethe syrcis Hew.

Mandarina regalis Leech

Melanitis autumnalis Fruhst.

Melanitis ismene Cr.

Melanitis ismene determinata Btlr.

Melanitis leda Linn.

Hong Kong I., alt. 500-800 ft., May 26, 1935, Ernest R. Tinkham; Yunnan, Temple of 500 Centi (5 mi. NW. Yunnanfu), Sept. 3, 1934, Ernest R. Tinkham.

Melanitis leda aswa Moore

Mycalesis gotama Moore

Mycalesis neovisala Fruhst.

Mycalesis otrea Cramer

Neope muirheadi Fldr.

Orsotriaena meda Fabr.

Hainan I., Nam-ting-ts'uen, (10 mi. NE. of Sam-ah-kong), Yai-hsien Dist., Feb. 14-16, 1935, F. K. To.

Orsotriaena runeka Moore

Ypthima albescens Pouj.

Ypthima argus Btlr.

Ypthima avanta Moore

Fung Van, near Lung Tau Shan, Sept. 13, 1923, Y. T. Tsang, (2).

Ypthima chinensis Leech

Ypthima huebneri Kirby

Yunnan, Pi Shit Chai (near Mengtsz., alt. 6500-7500 ft.) Aug. 19, 1934, Chauncey Brownell; Yunnanfu (West Hills, alt. 6500-7500 ft.) August 21-22, 1934, Ernest R. Tinkham.

Ypthima motschulskyi Mén.

Ypthima ordinata Btlr.

Ypthima sakra Moore

Yunnan, Temple of 500 Centi (5 mi. NW. Yunnanfu), Sept. 3, 1934, Ernest R. Tinkham.

Ypthima zodia Btlr.

Zophoëssa andersoni Atkinson

Yunnan, Tia Feng On (grassy. hill, 3 mi. N. Yunnanfu), August 25, 1934, Ernest R. Tinkham.

MORPHOIDAE

Stichophthalma howqua Westwood

Hainan I., Tai-tsing-lam-ts'uen, back of Lai-mo-ling (Mt. range), Ting-an District, June 13-16, 1935, F. K. To (2).

NYMPHALIDAE

Apatura parisatis staurakius Fruhst.

Argynnис laodice Pallas

Gotumba, Japan., alt. 2000 ft., July 13, 1933, J. Shackford.

Argynnис rudra Moore

Yunnan, Shui Tang, (20 mi. E. of Yunnaufu), pine mts., alt. 6800-8000 ft., Aug. 28-29, 1934, Ernest R. Tinkham.

Cethosia biblis Drury

Fong Tong Ping, Hoh Kai Hon, Lien Dist., July 6-7, 1934, F. K. To; Hainan I., Nodoa Tan-hsien (District), Aug. 1-26, 1936, T. C. Li.

Cethosia biblis hainana Fruhst.

Hainan I., Nam-liu-tin, Lam-wan-tung, (Loi territory), Kiung-shan District, July 26, 1935, F. K. To, (2); Cheung-kong city, Ch'ang-kiang District, March 12, 1935, F. K. To, (2); Sam-ah-kong, Yai-hsien District, Feb. 1, 6, 1935, F. K. To (2), Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (Mt. range), Kiung-shan District, April 28-30, 1935, F. K. To.

Cethosia cyane Drury

Charaxes athamas Drury

Canton, Honam I., P'an-yu District, Aug. 9, 21, 1923, W. T. Tsang, (2).

Charaxes polyxena Cramer

Cirrochroa mithila Moore

Hainan I., Nam-liu-tin, Lam-wan-tung (Loi territory), Kiung-shan District, July 29-30, 1933, F. K. To, (2).

Cynthia hainana Holl.

Cyrestis cocles cocles Fabr.

Hainan I., Sam-ah-kong, Yai District, Jan. 24-26, 1935, F. K. To.

Doleschallia bisaltide continentalis Fruhst.

Hainan I., Nam-ting-ts'uen, (10 mi. NE. of Sam-ah-kong), Yai Dist., Feb. 14-16, 1935, F. K. To.

Eulepis eudamippus Doubleday

Euthalia lubentina Cramer

Canton, Honam I., July 11, 1932, Ernest R. Tinkham.

Euthalia phemius Doubleday

Canton, Honam I., P'an-yu Dist., Oct. 7, 1934, Ernest R. Tinkham.

Euthalia thibetana Poujade

Yunnanfu, (West Hills, alt. 6500-7500 ft.), Yunnan, Aug. 21-22, 1934, Chauncey Brownell.

Euthalia telchinia Mén.

Hainan I., Nam-po-ts'uen, (Loi territory), Ch'eng-mai District, Sept. 1-3, 1935, F. K. To.

Euthalia sp.**Issoria sinha** Koll.**Limenitis procis** Cramer

Hainan I., San-ts'uen-Kai-hui, SE. of Lai-mo-ling, (Mt. range), Ting-an District, July 4-6, 1935, F. K. To, (2).

Hypolimnas bolina Linn.

Canton, Honam I., P'an-yu Dist.; Swatow, Ch'eng-hai Dist., Sept. 4, 1934, Y. C. Ng; Sept. 9, 1934, Y. C. Ng, (2).

Hypolimnas misippus Linn.

Swatow, Ch'eung-hai Dist., Oct. 25, 1934, Y. C. Ng; Sept. 11, 1934, Y. C. Ng.

Melitaea athalis ?

Yunnan, Tia Feng On (grassy hill 3 mi. N. Yunnanfu), August 25, 1934, Ernest R. Tinkham; Shui Tang (20 mi. E. of Yunnanfu), pine mts., alt. 6800-8000 ft., Yunnan, Aug. 28-29, 1934, Ernest R. Tinkham; Pi Shit Chai (near Mengtsz, alt. 4500-5500 ft.), Yunnan, Aug. 18, and Sept. 6, 1934, Ernest R. Tinkham.

Neptis hylas acerides Fruhst.**Neptis hylas hainana** Moore

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Feb. 6, 1935, F. K. To; Yunnanfu, (West Hills, alt. 6500-7500 ft.) Yunnan, Aug. 21-22, 1934, Ernest, R. Tinkham.

Neptis formosaria Fruhst.**Neptis mahendra** Moore

Tonkin, French Indo-China, Laokay, (in W.-NW. part) Aug. 12-13, 1934, Ernest R. Tinkham.

Neptis soma Moore**Pantoporia cama** Moore**Pantoporia zeroa** Moore**Polygonia c-aureum** (Linnaeus)

Fung-wan, (near Lung-tau-shan ?), Sept. 15, 1923, W. T. Tsang.

Precis almana Linn.

Canton, Honam I., P'an-yu District, Oct. 21, 1935; Nov. 10, 1935, F. K. To; Canton, White Cloud Mountain, P'an-yu District, Jan. 9, 1935, Ernest R. Tinkham; Hainan I., Tai-pin-ts'uen, Lam-ka-

heung, Lai-mo-ling, (Mt. range), Kiung-shan District, May 17-18, 1935, F. K. To; Yunnan, Pi Shit Chai (near Mengtsz, alt. 4500-5500 ft.), Aug. 18, 1934, Ernest R. Tinkham.

Precis aonis Cramer

Precis atlites Linn.

Honam I., Canton, P'an-yu Dist., Oct. 21, 1935, Y. C. Ng; Hainan I., Kom-yan city and vicinity, Kan-en Dist., March 9, 1935, F. K. To.

Precis iphita Cramer

Precis laomedea Linn.

Canton, P'an-yu Dist., Nov. 19, 1935, F. K. To; Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Feb. 1, 1935, F. K. To.

Pyrameis cardui Linn.

Hainan I., Kom-yan city and vicinity, Kan-en Dist., March 9, 1935, F. K. To.

Pyrameis indica Hrbst.

Rahinda hordonia Stoll.

Rahinda hordonia rihodina Moore

Hainan I., Kom-yan city and vicinity, Kan-en Dist., March 9, 1935, F. K. To.

Rahinda maligowa Fruhst.

Symbrenthia lucina Cramer

Vanessa charonia Drury

Vanessa urticae chinensis Leech

Yunnanfu, (West Hills, alt. 6500-7500 ft.), Yunnan, August 21-23, 1934, Ernest R. Tinkham; Tai Feng On, (grassy hill 3 mi. N. Yunnanfu), Yunnan, Aug. 25, 1934, Ernest R. Tinkham.

Yoma sabina vasuki Doherty

Hainan I., Loh-fung-tung, Yai-hsien (Dist.), Feb. 17-18, 1935, F. K. To; Hainan I., Cheung-Kong city, Ch'ang-kiang Dist., March 12, 1935, F. K. To.

ACRAEIDAE

Pareba vesta Fabr.

Tai Wa Tsz., July 28-29, 1935, C. W. Brownell; Lungchow (Mts.), Kwangsi, Aug. 8, 1934, Chauncey Brownell, (2); Mts., 5 mi. S. of Lungchow, Lungchow Dist., Kwangsi, Aug. 8, 1934, Ernest R. Tinkham (2).

NEMEOBIDAE

Dodona durga Kollar

Tia Feng On (grassy hill, 3 mi. N. Yunnanfu), Yunnan, Aug. 25, 1934, Ernest R. Tinkham, (2); Shui Tang, (20 mi. E. of Yunnan-

fu), pine mountains, alt. 6800-8000 ft., Yunnan, Aug. 28, (3), and 28-29, (4), 1934, Ernest R. Tinkham.

Sospita fylla Doubleday

PAPILIONIDAE

Leptocircus curius Fabr.

Hainan I., Tai-ping-ts'uen, Lam-ka-heung, Lai-mo-ling, (Mt. range), Kiung-shan Dist., April 28-30, 1935, F. K. To; Hainan I., Sam-ts'uen-kai-hui, SE. of Lai-mo-ling, (Mt. range), Ting-an Dist., July 4-6, 1935, F. K. To; Pi Shit Chai (near Mengtsz), alt. 4500-5500 ft., Yunnan, Sept. 6, 1934, Ernest R. Tinkham; Dragon Noir, (200 mi. S. of Mengtsz), alt. 5000 ft., Yunnan, Aug. 19, 1934, Ernest R. Tinkham; Copper Temple, (4 mi. N. of Yunnanfu), alt. 6000-6500 ft., Yunnan, Aug. 27, 1934, Ernest R. Tinkham.

Papilio aidoneus Doubleday

Hainan I., Tai-ping-ts'uen, Lam-ka-heung, Lai-mo-ling, (Mt. range), Kiung-shan Dist., May 8-9, 1935, F. K. To, (2).

Papilio chaon Westw.

Papilio chaon chaonulus Fruhst.

Hainan I., vicinity of village at foot of Lai-mo-ling (Mt. range), Kiung-shan Dist., May 25-28, 1935, F. K. To; Hainan I., Uen-moon-tung, 20+ mi. S. of Fan-ta village in Ting-an Dist., July 14-15, 1935, F. K. To.

Papilio memnon agenor Linn.

Papilio memnon phoenix Dist.

Papilio nevilli Wood-Mason

Yunnanfu (West Hills, alt. 6500-7500 ft.), Yunnan, Aug. 21-22, 1934, Chauncey Brownell.

Papilio nomius swinhoei Moore

Hainan I., Cheung-kong city, Ch'ang-kiang Dist., March 12, 1935, F. K. To.

Papilio philoxenus termessus Fruhst.

Taihoku, Taihoku Prefecture, Formosa, alt. 2000 ft., Dai Tong, Aug. 16, 1935, Ernest R. Tinkham.

PIERIDAE

Appias enaretina Fruhst.

Appias hippoides Moore

Appias libythea zelmira Cramer

Hainan I., Nam-ting-ts'uen, (10 mi. NE. of Sam-ah-kong), Yai-hsien (Dist.), Feb. 14-16, 1935, F. K. To, (2); Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Feb. 1, 1935, F. K. To; Tongking, French

Indo-China, Laokay, (in WNW. part), Aug. 12-13, 1934, Ernest R. Tinkham.

Appias lyncida inornata Moore

Hainan I., Nam-liu-tin, Lam-wan-tung, (Loi territory), Kiung-shan Dist., July 29-30, 1935, F. K. To; Hainan I., Nam-po-ts'uen, (Loi territory), Ch'eng-mai Dist., Sept. 1-3, 1935, F. K. To.

Colias croceus fieldii Mén.

Shui Tang, (20 mi. E. of Yunnanfu), pine mts., alt. 6800-8000 ft., Yunnan, Aug. 28-29, 1934, Ernest R. Tinkham.

Colias shyale Linn.

An Ning Djou, Hot Spring, alt. 6500 ft., Yunnan, Sept. 4, 1934, Ernest R. Tinkham, (4); Tia Feng On, (grassy hill 3 mi. N. Yunnanfu), Yunnan, Aug. 25, 1934, Ernest R. Tinkham, (2).

Delias hicta Hubner

Lungchow, Lung-cheu Dist., Kwangsi, Aug. 7-8, 1934, Chauncey Brownell; Mts. 5 mi. S. of Lungchow, Lung-cheu Dist., Kwangsi, Aug. 8, 1934, Chauncey Brownell, (5).

Dercas verhuelli Van der Hoeven

Huphina nerissa Fabr.

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1934, F. K. To; Hainan I., Loh-fung-tung, Yai-hsien (Dist.), Feb. 27-28, 1935, F. K. To; Nanping, Yih-ning Dist., Kwangsi, Aug. 2-3, 1934, Ernest R. Tinkham.

Ixias pyrene Linn.

Canton, Honam I., P'an-yu Dist., March 23, 1923, W. T. Tsang; Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1935, F. K. To.

Leptosia xiphia Fabr.

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-25, 1935, F. K. To.

Terias fimbriata Wall.

Terias hecate apicalis Moore

White Cloud Mountain, Canton, P'an-yu Dist., Jan. 9, 1935, Ernest R. Tinkham; An Ning Djou, Hot Spring, alt. 6500 ft., Yunnan, Sept., 4, 1934, Ernest R. Tinkham.

Terias hecate asphodelus Btlr.

Canton, P'an-yu Dist., Jan. 6, 1923, W. T. Tsang; Copper Temple, 4 mi. N. of Yunnanfu, alt. 6000-6500 ft., Yunnan, Aug. 27, 1934, Chauncey Brownell.

Terias hecate merguiana Moore

An Ning Djou, Hot Spring, alt. 6500 ft., Yunnan, Sept. 4, 1934, Ernest R. Tinkham.

***Terias hecate swinhoei* Moore**

Tia Feng On, (grassy hill, 3 mi. N. Yunnanfu), Yunnan, Aug. 25, 1934, Chauncey Brownell; Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Feb. 1, 1935, F. K. To.

***Terias irregularis* Moore**

***Terias laeta* Bdv.**

***Terias libythea* Fabr.**

***Terias mandarina* de L'orza**

***Terias silhetana* Wallace**

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1935, F. K. To.

***Pareronia hippia* Fabr.**

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1935, F. K. To; Hainan I., Nam-ting-ts'u'en, (10 mi. NE. of Sam-ah-kong), Yai-hsien (Dist.), Feb. 14-16, 1935, F. K. To; Hainan I., Kom-yan city and vicinity, Kan-en Dist., March 9, 1935, F. K. To.

***Pieris daplidice* Linn.**

Tia Feng On, (grassy hill, 3 mi. N. of Yunnanfu), Yunnan, Aug. 25, 1934, Ernest R. Tinkham.

***Pieris rapae* Linn.**

Copper Temple, 4 mi. N. of Yunnanfu, alt. 6000-6500 ft., Yunnan, Aug. 27, 1934, Ernest R. Tinkham; Shui Tang, (20 mi. E. of Yunnanfu), pine mts. alt. 6800-8000 ft., Yunnan, Aug. 28-29, 1934, Ernest R. Tinkham; An Ning Djou, Hot Spring, alt. 6500 ft., Yunnan, Sept. 4, 1934, Ernest R. Tinkham.

***Prioneris clemantine* Doubleday**

Hainan I., Lai-mo-ling, Kiung-shan Dist., May 22, 1935, F. K. To; Hainan I., Nam-po-ts'u'en, (Loi territory), Ch'eng-mai Dist., Sept. 2-3, 1935, F. K. To.

Prioneris euclemanthe* Fruhst*LYCAENIDAE*****Amblypodia horsfieldi* Pag.**

Hainan I., Nam-liu-tin, Kiung-shan Dist., July 29, 1935 ?, F. K. To.

Amblypodia paramuta* de Nicev.**Amblypodia rama* Koll.*****Amblypodia* sp.**

Fung-wan (near Lung Tau Shan ?), Kwangtung, Sept. 13, 1935, W. T. Tsang.

Amblypodia sp. near **adriana** Nic.

Loh-kong-tung, Kwangtung, Dec. 17, 1933, Ernest R. Tinkham.

Aphnaeus **lohita** Horsf.

Loh-fau-shan, Wa Shau Toi, alt. 800 ft., July 20, 1935, Ernest R. Tinkham.

Aphnaeus **syama** Horsf.

Yunnanfu, (West Hills, alt. 6500-7500 ft.), Yunnan, Aug. 21-22, 1934, Ernest R. Tinkham, (2); Shui Tang, (20 mi. E. of Yunnanfu), pine mts., alt. 6800-8000 ft., Yunnan, Aug. 28-29, 1934, Ernest R. Tinkham, (3).

Castalius **rosimon** Fabr.

Hainan I., 1932, William E. Hoffmann.

Castalius **roxus** Godert

Hainan I., Nam-ting-ts'uen, (10 mi. NE. of Sam-ah-kong), Yai-hsien (Dist.), Feb. 14-16, 1935, F. K. To.

Catochrysops **cnejus** Fabr.

Catochrysops **strabo** Fabr.

Pi Shit Chai, (near Mengtsz, alt. 4500-5500 ft.), Yunnan, Aug. 18, 1934, Ernest R. Tinkham.

Chilades **varunana** Moore

Chrysophanus sp.

Swatow, Ch'eng-hai Dist., Aug. 12, 1933, Y. C. Ng.

Curetis **bulis** Dbl. & Hew.

Curetis **dentata** Moore

Cyaniris **puspa** Horsf.

Tai Wan Tsz, July 28-29, 1935, C. P. Brownell; Hong Kong I., alt. 500-800 ft., May 26, 1936, Ernest R. Tinkham.

Deudorix **epijarbas** Moore

Lingnan University campus, Canton, P'an-yu Dist., April 19, 1938, Y. W. Djou; Canton, Honam Island, April 23, 1938, Wm. E. Hoffmann.

Deudorix **jarbas** Moore

Everes **parrhasius** Fabr.

Heliochorus **epicles** Godt.

Horsfieldia **hainana** Crowley

Irsota **maecenas** Fabr.

Canton, P'an-yu Dist., March 2, 1935, Ernest R. Tinkham.

Jampides **bochus** Cramer

Lampides **celeno** Cramer

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Feb. 6, 1935, F. K. To, (3); Hainan I., Nam-ting-ts'uen, (10 mi. NE. of Sam-ah-kong), Yai-hsien (Dist.), Feb. 14-16, 1935, F. K. To.

Loxura leminius Fruhst.

Hainan I., Nam-liu-tin, Lam-wan-tung, (Loi territory), Kiung-shan Dist., July 29-30, 1935, F. K. To.

Lycaenopsis albocoerulus Moore

Pithecopus hylax Fabr.

Remelana jangala Horsf.

Spindasis lohita Horsf.

Spalgis epius Westw.

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1935, F. K. To.

Syntarucus plinius Fabr.

Hainan I., Sam-ah-kong, Yai-hsien (Dist.), Jan. 24-26, 1935, F. K. To.

Taraka hamada Drc.

Zizera gaika Trimen

Tonkin, French Indo-China, Laokay, (in WNW. part), Aug. 12-13, 1934, Ernest R. Tinkham.

Zizera indica Moore

Zizera otis Fabr.

Copper Temple, 4 mi. N. of Yunnanfu, alt. 6000-6500 ft., Yunnan, Aug. 27, 1934, Ernest R. Tinkham.

HESPERIIDAE

Aeromachus sp.

Yunnanfu, (West Hills, alt. 7000-8000 ft.), Yunnan, Sept. 1, 1934, Ernest R. Tinkham.

Astictopterus olivascens Moore

Tonkin, French Indo-China, Laokay, (in WNW. part), Aug. 12-13, 1934, Ernest R. Tinkham.

Celaenorhinus patula de Nicev.

Daimio sp.

Yunnanfu, (West Hills, alt. 6500-7500 ft.), Yunnan, Aug. 21-22, 1934, Ernest R. Tinkham.

Halpe sp.

Hasora badra Moore

Hasora vitta Btlr. ?

Shui Tang, (20 mi. E. of Yunnanfu), pine mt., alt. 6800-8000 ft., Yunnan, Aug. 28-29, 1934, Ernest R. Tinkham.

Ismene ataphus Watson

Lung T'au Shan, K'u-h-kiang Dist., Sept. 24, 1923, W. T. Tsang; Loh Fau Shan, Wa Shau Toi, alt. 800 ft., Aug. 27, 1933 and July 23, 1935, Ernest R. Tinkham; Loh Fau Shan, Big Pool, Oct. 12, 1935, Ernest R. Tinkham.

Isoteinon lamprospilus Felder

Loh Fau Shan, Big Pool, Aug. 8, 1933, Ernest R. Tinkham.

Notocrypta rectifascia Leech

Satarupa diversa Leech

Tagiades litigiosa Möschl.

Taractrocera atropunctata Watson

Lung T'au Shan, K'u-h-kiang Dist., Sept. 29, 1925, W. T. Tsang; Hong Kong I., alt. 500-800 ft., May 26, 1935, Ernest R. Tinkham.

Telicota augias Linn.

Hainan I., Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling, (Mt. range), Kiung-shan Dist., April 20-24, 1935, F. K. To.

廣東省及海南島之蝶類誌

吳玉洲著

嶺南大學自然博物採集所

(摘要)

本文論及廣東省及海南島之蝶類一六九種。上述品種，連同嶺南大學自然博物採集所新近發表二文，共有蝶類三三一種，均由本所採自廣東省及海南島各地。各標本現存嶺南大學自然博物採集所。

SHORTER ARTICLES AND SCIENTIFIC NOTES

Diary of a Small Experimental Bamboo Planting.—In April, 1931, a small area of land on the Lingnan University Campus which had formerly been used as a dumping ground for garbage and litter was retrieved and planted to bamboo. Certain records on the progress of the development of the plantation were kept until the autumn of 1937 when an emergency order for large numbers of bamboo culms for making bomb-proof shelters resulted in the disruption of the continuity of the experiment. There is so little published information on bamboo production in this area that it is deemed worthwhile to make available a digest of the records of this experiment.

The bamboo planted (our BG No. 2669) is a sympodial species very commonly found in cultivation in this area, namely *Bambusa breviflora* Munro, locally known by the names Ngaang Shaang T'o (硬生桃), Shui Chuk (水竹) and Ch'aang Ko Chuk (擇高竹).

The piece of land used is very irregular in shape. On the basis of careful measurements, Mr. Li Peng-fei calculated its area to be about 4160 sq. ft., which is a little less than a tenth of an acre, or somewhat over four-tenths of a mu.

Ninety young culm divisions, about ten months of age, were set out in pairs, the average planting distance being nearly ten feet, allowing for the border, where the plants utilized soil and light beyond the actual measured area. (It is more than likely that better results would have been obtained if the planting distance had been somewhat greater.)

At current prices the plants would have cost about \$18.00 local currency. The original labor cost was very slight, perhaps not more than \$2.00, to which may be added the cost of putting up a light bamboo fence around two sides of the lot for protection, and a few days of labor during the first year for watering and weeding, say a total of \$25.00 local currency "capital outlay."

By the end of August in the same year (the planting was done in April) 87 new shoots had appeared, the tallest of which attained a height of 3 meters and a diameter of 2.2 cm. (2.45 cm. equal one inch; one meter equals 39.37 inches).

In 1932, another 415 new culms were produced, the tallest of which reached a height of 6 meters and a diameter of 4 cm.

In March, 1933, 167 of the culms produced in 1932 were taken up to start another experimental planting. In that same year, in spite of this reduction of the productive stock, 348 new culms were produced, the tallest of which reached a height of 7.5 meters and a diameter of 5.3 cm.

In March, 1934, an additional 125 culms, from the 1933 crop, were taken up to be planted at the Ooi T'ung Agricultural Experiment Substation of Lingnan University. In that year 333 new culms

were produced, the tallest of which reached a height of 12 meters and a diameter of 5.8 cm.

The 1935 crop numbered 281 new culms, the tallest of which was 12 meters in height and 5.8 cm. in diameter.

The figures for 1936 are somewhat incomplete; an early count listed 193 new shoots, the tallest of which reached a height of 12 meters and a diameter of 6.1 cm. It is probable that the number of new culms sent up in that year exceeded 200.

In 1937, the total number of new culms produced was 258, the tallest of which reached a height of 12 meters and a diameter of 6.2 cm.

It is apparent that the maximum culm height was reached at 12 meters in 1934, only three years after the unrooted culm divisions were set out. This is considered to be an exceptionally short time for the achievement of mature culm height. The rapid development was probably due to the combination of high fertility and ample moisture-yielding power in the soil together with the wellnigh perfect drainage prevailing in the plot selected. It will be noted that the maximum diameter of the culms produced in each successive year continued to increase, even to 1937, the last year for which we have records, at which time it was 6.2 cm. (about 2.5 in.).

It is a striking fact that, by the end of the second growing season, the number of new culms was 502, or 5.55 for each culm originally planted. The total number of culms produced in seven years from the 90 original culm divisions, in spite of the removal of 292 culms for propagation, was 1876, or an average of nearly 21 for each original plant. This may not be a very striking figure, but the potential economic returns are worth recording.

The 167 plants lifted in 1933 would have sold, at the rate of 15 cents per plant, for about \$25.00 local currency. The 125 plants taken up in 1934, being larger, would have sold for at least 20 cents per plant, or \$25.00. The 125 mature culms cut in 1937 would have sold for another \$25.00, making a total calculated value of \$75.00 for the plants actually removed. Adding to this the estimated value of the plants remaining at the end of 1937 we have the following figures for the actual numbers of plants, and a very close estimate of the actual value of the total production, from a nucleus of 90 bamboo plants grown on 0.437 mau (less than $\frac{1}{10}$ acre) of land, in 7 years.

259 culms of 1937, worth, as nursery stock,	\$ 38.85
200 culms of 1936, worth, as nursery stock,	40.00
1000 culms of previous years, worth for timber,	125.00
417 culms already removed, as listed above	75.00

1876	\$278.85
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We find that 1876 plants, worth a total of \$278.85 were produced. Making a generous allowance (say \$103.85) for the outlay of labor actually expended and the value of the original propagating material, together with interest on the original investment of \$25.00, and the cost of harvesting what remains, there is left a balance of \$175.00 as the net return on 0.437 mau (less than one tenth of an acre) of land, for a period of seven years. This amounts to a return on the land at the rate of \$250 per acre, or about \$50.00 per mau, per year. It is not assumed that such large returns may be expected from ordinary land cultivated on a larger scale, however. But very profitable returns may be expected under good conditions.

The following record of the year by year production of new culms from a single culm division of the same lot of bamboos planted in 1931 may also be of interest.

TABLE 1
Production from a single culm division

YEAR	ULTIMATE DIMENSIONS OF LARGEST CULM		NUMBER OF NEW CULMS PRODUCED	TOTAL NEW CULMS TO DATE
	HEIGHT	DIAMETER		
1931	3.0 meters	3.0 cm.	4	4
1932	5.0 meters	4.6 cm.	12	16
1933	7.5 meters	5.0 cm.	18	34
1934	12.0 meters	5.8 cm.	18	52
1935	12.0 meters	5.8 cm.	21	73

The total number of culms produced from a single culm division in five years is seen to be 73. The most remarkable expansion came during the first two years, at the end of which time the original plant had multiplied itself by 16. Thenceforth the rate of increase declined, chiefly, no doubt, because of increased crowding and the resultant competition for light, moisture and mineral nutrients. It is probable that the actual number of plants produced could have been increased considerably by dividing the clumps every second year, thus multiplying the number of parent plants and relieving the congestion, though the average culm size would probably have undergone a marked reduction under this treatment.

The larger significance of records such as those presented here can be made clear only when the relevant environmental conditions, including amount and distribution of insolation, heat and precipitation, the wind velocity, temperature and the water relations of the air and of the soil, etc., prevailing at various stages in the development of the bamboo plants have been studied and correlated therewith. Planting distance, operating through the various fundamental factors of the environment, has an important effect upon the behavior of the plants. The vigor of the stock used, and the stage

of its development in relation to the reproductive (flowering) period, may have a very important bearing upon the productivity of a given planting. When any of the plants reach the flowering stage, the decline of their vegetative activity cuts down the yield very seriously.

It is a pleasure to acknowledge the skilful and efficient service rendered by my Garden Assistant, H. Fung (Fung Hom), in carrying out the various operations upon which the success and continuity of this experiment depended.

F. A. McClure

CURATOR OF ECONOMIC BOTANY
LINGNAN NATURAL HISTORY SURVEY AND MUSEUM

竹之種植試驗

莫古禮著

嶺南大學經濟植物系主任

(摘要)

作者於民國廿二年四月種 0.437 畝(約合 10 英畝)竹 (*Bambusa breviflora* Munro) 九十株，林地土質肥沃，且排水暢利。該竹於中國內，稱為硬生桃竹，水竹，撐高竹等。每年所生株數，均有詳確紀錄，至於生長最高度及直徑等，亦經紀錄七年。種後至第三年，生長最高度數為 12 公尺 (meters)，以後無甚增長，惟直徑則每年繼續增大，至第七年時為 6.2 寸 (centimeters)。

在此林中所生之 1876 株竹，如用為蕃殖母本及木材等，約可估值二百七十八元八毫五仙廣東毫券。由此推算，則每年每畝可獲純利五十元。

一母株所生株數之紀錄，經單獨的繼續五年，其結果為共有七十三株。

In Search of a Forgotten Tribe—the Yao People of the Mountains.—Pilgrims and tourists who visit the famous Loh Fau Mountains are so much amazed at the beauty of the natural scenery that they do not like to distract themselves with other matters or which the Yao people is one. The number of these people is very small and their villages are hidden away from the main passes. These people used to differ from the Chinese in customs, habits, beliefs, mode of living and speech. Now they dress themselves exactly as the Chinese and can speak all the Chinese dialects that exist around them, besides their own. For these reasons they escape the attention of sightseers and casual observers almost entirely. They have tried all they can to be forgotten, and people forget them.

But to anthropologist and linguist, these people are valuable specimens. A careful study of their life, past and present, might throw some light upon the yet unsettled problem of their migration and an analysis of their speech will perhaps explain the origin of many of the unwritten colloquialisms in the neighboring Chinese dialects. Below is a brief account with respect to Location, Population, History, General Mode of Living, and Speech.

Location.—There are two Yao villages (clan names being Poon 鮑, Lui 魏, and Loi 球) in the Loh Fau Mountains. The small one is situated in a ravine west of Tuk-Ling Aau (禿嶺凹) about 1.5 miles off the main road. The large one, where the writer spent three days and nights, is situated in the northeast of the same Aau on the other side of the mountain. About 20 steps from the top of the Aau, facing So-liu monastery, left of the main road, deviates a little path that leads through a rather dense forest into another still bigger one for less than a mile, and between them is the village, called Ha-Shui (吓水), completely hidden. There are about 40 houses all made of mud. The back wall of the village has entirely collapsed and is replaced by a long row of large timbers in order to keep away tigers, boars, and other wild animals. The mountain that forms the background of the village is called Cheung-Muk Ling, on the top of which among the thorns and shrubs are two tiger traps 15-20 feet deep, $\frac{1}{4}$ mile away from each other. From the top one sees the mountain ranges ramifying on all sides, north into Lung-moon, west into Tsang-shing, and east into Pok-loh. The summit is the border line of these three districts.

In front of the village is a little stream which supplies water for the terrace farms down in the valley, tilled by the Yao people.

There are two other Yao villages (clan names being Laam (藍) in one and Loi 球 in another) on the eastern outskirt of the Loh Fau Mountains.

Population.—The Yao people in these four villages do not exceed 150 men and women, old and young. The village where I stayed has

10 males (8 adults, 2 boys) with the family name of Poon 龐, 3 with the name of Lui 雷 and 9 with the name of Loi 來. The females are still fewer.

One may wonder why the number of persons, in this village is smaller than the number of houses. There are several reasons for this. Since there have been only four families among the Yao people for the last few centuries inbreeding has taken place with resultant feebleness and small reproduction. I saw only two or three babies in the whole village. Health conditions are poor and there is no medical attention. Most of the people look very weak and sickly, and the rate of mortality is extremely high. None of the Yao in the village at the present time has reached the age of fifty. They can barely make a living even with the hardest kind of toil. Some Yao have gone away and have adjusted themselves as tenants to Chinese farmers. All these causes effect a very speedy decrease of population.

History.—The earliest settlement of these Yao people in the Loh Fau Mountains cannot be ascertained, but from the scanty information which is found in the Chi 志 (i.e. the published records relating to the history, customs, geography, literature, etc., of Loh Fau Mountains and bordering districts, it is possible to make some preliminary propositions. An article on the mapping of Loh Fau, written by a monk named Tsou (鄒師仁) in the Sung Dynasty does not mention the Yao, and we may presume that these people had not come then. In the Chronicle of the Sung Dynasty 宋史 we find that the Yao began to migrate south from Hunan Province and settled in the north part of Kwangtung as early as 1043. The Linchow records (連州縣志) indicate that in the reign of Shau Hing (紹興) (Sung, 1131-1162) a Chinese name Liao (廖) brought back from Kwangsi a number of Yao people to till the farms in Linchow where they remained and reproduced so prolifically that they were afterward divided into 8 branches (八排). Linchow and its neighboring districts still remain the most densely populated regions of the Yao in Kwangtung. The years, 1139-1209 saw a series of serious attacks on the Yao by the armies of Sung from the north. I presume that some Yao, fearful for the safety of their new colonies, spread further east. The Yao of Loh Fau might have come then, down through the Yuan Dynasty. Until the beginning of Ming Dynasty so many of them came to Loh Fau that the Chinese government found it necessary to appoint a local magistrate to rule over them. In the reign of Lung King (隆慶, 1567-1573) they joined a mutiny motivated by the rebels of Tsung-fa (從化). A citizen named Lai Pong-ning (黎邦寧), of Tsang-Shing, however, suppressed the rebellion and was given the official title of Yao Kwan, or the Ruler of the Yao, which has been inherited by his descendants down to the present time.

The writer during his trip made a visit to the descendants of this Yao ruling family in Tsang-Shing city and found that they still

possess the official seal which they inherited from their ancestors. It reads: Pacification Ruler of the Yao in Tsang-Shing, Pok-Loh, Tsung-Fa and Lung-Moon District (增薄龍從撫撫官印).

The Yao Kwan differs from ordinary Kwan in that his power over the Yao is supreme and the Yao recognize him as the only ruler. In the previous dynasty they did not take orders from the Manchu government because their ruler was a descendant of an official of Ming Dynasty.

In the beginning of the Manchu Dynasty, when Tsang-Shing was overrun with banditry, the Yao Kwan Lai Chen-Tsai gathered his subjects (Yao) in the seat of the district government of Tsang-Shing defending the four gates of the town. Thus the city was saved from robbery. It was for such merits that the official hereditary title of Yao Kwan was recognized and conferred again by the Manchu government, and the Yao people with their Chinese "king" at the head remained undisturbed in the mountains throughout the Ching Dynasty.

But now this once powerful and well-organized tribe has decreased so much that they are no longer remembered by their neighbors. For the several reasons alluded to previously they will perhaps vanish from this part of the province; they face extinction the most tragic end that any race can experience.

Living Conditions.—As these people are living amid overwhelming numbers of Chinese neighbors, they are compelled by circumstance to imitate the customs, habits, and speech of the Chinese. The Loh Fau Chi records that each Yao family was accustomed to hang a picture of a dog's head in human costume and worship it very piously. An unmarried woman braided her hair into one knob, a middle-aged woman, two knobs, and an old woman, three knobs. The men liked to fight as in the case of many primitive people. All these primitive practices have disappeared. They now till their farms just like the Chinese, hunt for game like other mountaineers. They trade with the Chinese in Ching-Kuo (正果) regularly. Even inside their village one sees nothing that is exclusively their own.

But they worship a god called Pan-Ku Wang (盤古王) which the Chinese do not worship. They never intermarry with outsiders. There is a shortage of women in these four Yao villages and therefore a Yao girl is prohibited from going away from her own people. Her family will be punished if she does so. A girl without parents or uncles, however, may steal away in an elopement, but this is very rare.

Speech.—As I mentioned before, the Yao are forced to adjust themselves to the Chinese mode of living. In speech they succeed wonderfully. All of them can speak the native dialect of the Chinese and the Hakka dialect—these two being the medium of expression in Ching-Kuo Market where they trade with the Chinese. They also

speak the So-Loh dialect which is common in a cluster of villages in the same mountains, and imitate the Cantonese dialect pretty smoothly. They can do no better to adjust themselves to the Chinese environment in the way of speech. Sentence construction is similar to Chinese.

But this does not interest a linguist so much as the speech which they actually speak among themselves at home. As most of their customs and habits have disappeared, their speech remains one of the few traces for their identification. Here only a few examples will be given for illustrations.

Their cardinal numbers bear great similarity to Chinese. They are:

'i	-u	-ba	'bi	-be	,go	tsuŋ	'i	-kiu	'kœo	'ni	-san
1	2	3	4	5	6	7	8	9	10	20	30

It will be noticed that the language is tonic, as the number "one" differs from the number "eight" only in tone.

There are also classifiers as in Chinese. But when the numbers above 20 are used with classifiers, classifiers must be repeated thus: 22 cows is 'ni -naŋ -u -naŋ -ηωɔ (20 pieces 2 pieces cows). With other numerary adjuncts usage differs, thus: 31 years (old is -san 'sui 'i (30 years one).

Household words such as names of objects, -ŋi -dəŋ (rope), 'kɔŋ (door), -ni (house), 'ki 'gin (tea cup), /gwt/ (rice); parts of the human body, 'mun (tooth), 'pi (tongue), -di, 'mɔ (face); common adjectives, -ga 'da (long), 'naŋ (short), -fun (high, 'kf (low), -kan (hot), -gœŋ (cold); and colors, -si (red), -kun (yellow), -gœŋ (white), 'ga 'pu (blue), -gian (black), are most of them unlike Chinese. Interrogative words and pronouns differ entirely from Chinese, thus "what?" is -ha 'la, "who" is 'be ne; "I" is -wan "you" is -mŋ, "he" is 'nŋ. As to expressions in the formula of attributive adjective or noun used attributively plus noun, there are still traces of inversions like the French, thus "saltfish" is 'bit -han (fish-salt), "man" is -ne 'bu (person-male), "woman" is -ne 'va (person-female), "big man" is -ne 'mf (person-big), boy is -ne -dan (person-diminutive ending), etc., but generally other such combinations are in accordance with the Chinese formula.

As I compare the unwritten colloquialism of Tsang-Shing dialect with the Yao dialect I find several similar expressions, thus:

liu (Tsang-Shing)	versus	liu (Yao)	— to stroll.
tsɛk (T. S.)	v.	tsɛ (Yao)	— cold (as cold water)

It is not certain whether the Yao takes over the Chinese expressions or vice versa, but as these two dialects have existed side by side for the last few centuries, a linguistic borrowing and interchange is inevitable.

A glance at the foregoing examples will show that none of the syllables ends in p, t, or k. This means that this dialect has undergone as radical changes in the course of time as Mandarin. It will be of great value to the linguist to compare this dialect with its more primitive form and those Yao dialects that exist in the northern part of Kwangtung, the whole of Kwangsi, and other regions where this language is spoken.

S. L. WONG (WONG SIK-LING, 黃錫凌)

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黃錫凌著

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(摘要)

羅浮山窮谷中有猺村四。人口日見減少。據地志考之，似爲南宋由湘桂入粵猺民之遺裔。其生活與齊民無異，且通曉漢語方言，然彼亦自有與漢語迥異之猺語。

Bird Records on Lantau Island.—The following notes of birds seen on Lantau Island were made by the writer when living in camp on Lantau Mountain and on trips to and from the landing at the seashore through the village of Tung Chung to the camp at the 2500 foot level. Notes were kept in a more or less desultory fashion in the summer seasons from 1925 to 1937 except for four summers; then, a more accurate record was made between July 31 to December 16, 1937. Observations for the most part were made from the house on the east peak of the camp. Appended is a list of birds seen by Captain Marmaduke Whittaker, of the Royal Welsch Fusiliers when at Lantau Mountain Camp, September 16-26, 1937. Captain Whittaker made daily trips to various places on the island, from sea level to Taai Ue Shaan. He has kindly permitted the writer to include the list in the present paper.

Many songs can be heard of birds which live in the dense woods along the trail at about the 1800 foot level, especially when a breeze carries these songs to the listener in a favorable location in the camp. Mists frequently cover the mountain and it is not rare to hear the call of a frightened bird as it hunts a passage over the peak. The occasion is frequent enough to note here a special instance. A new call was heard, a lovely gray bird appeared momentarily in the misty light but was gone too quickly for one to catch more than the following general impressions. It was like Swinhoe's Minivet, yet seemed longer and of more slender proportions. We propose to give in this report narratives of some of our regular bird residents and visitors of the camp. Had we been able to band the birds we would have had an interesting record of the birds common on the mountain.

Our first regular visitor was a Black Rock Thrush which perched regularly on a rock near the Mess Shack each summer. He was never tame although he lived nearby from 1925 to 1931. One season he lost half his tail and curiously enough the same thing happened to "Tatters" this last summer. Last summer, 1937, either this same thrush or a relative stopped on the rocks near the stream which supplies the camp with drinking water. These Black Rock Thrushes make a pretty sight as they fly down the valley from one rock perch to another.

Since 1935 a Violet Whistling Thrush and its mate have lived in the camp. The female became tame and went freely into the homes of her friends. She was very curious, perhaps was attracted by food with which she was enticed to become more friendly, yet she never seemed to come for that only. She frequented places about the house under the eaves and along the mountain paths, also hunted under rocks where she seemed to find food to her liking. Often she ventured in at the open door, lost her way out, and vainly attempted to find it by trying to go through the window panes. On one such

occasion the servant caught her for me. She did not like being held, bit savagely at my wrist, and was too scared to be quieted. We placed her in a box hoping to make closer observations as to feather colors etc., but she was so distressed and called so appealingly to her shy mate that there was nothing to do but to give her freedom, which done, the united pair flew off together. This experience daunted Madame Thrush not at all for she continued her regular visits and the morning was properly begun when we heard her about the house seeking food and her occasional low beautiful notes. The summer of 1937 she became the camp pet. She visited favorite homes regularly, learned to take food out of the hands of one friend, would perch on the arm of another and take food from her lips; but her most interesting stunt came when she got on the lap of a lady visitor and tried to eat the yellow buttons off her dress. Late in the autumn she lost part of her tail feathers and was thereafter called "Tatters". When the weather grew cold she moved down the stream of the swimming pool valley and was seen there on Nov. 3 and 18. She made her last visit into one of the homes early in December and a bit later was reported further down the valley. She looked fat, sleek, contented and greeted her friends most happily by walking about them.

Flocks of tiny brown birds were seen and heard and on several occasions but never clearly enough for a description or identification. Their calls were high "cheet", not unlike that of the Streaked Wagtail, but their notes were higher in tone and of greater frequency. The Streaked Wagtail is common on the mountain and on one occasion on Nov. 20, a mother and her fledgling were flushed in the stream bed but long searching failed to reveal the location of her nest. From Sept. 29-Nov. 4 there was heard at about nine o'clock in the evening the "hok hok" of a night bird which flew from the NW. part of the mountain to the SE. Swallows are regular summer visitors and the summer begins when we hear their notes and see them flying gracefully over ridges and down valleys. Their friends, the White-rumped Swifts, are seen occasionally during the summer months, however, in November and December they come in great numbers and fly endlessly over the mountain slopes and out over the ocean. One morning, November 19, I heard a low contented "Tsut, tsut, tsut" and following the call discovered a sleek fat Java Sparrow getting its breakfast at the foot of a boulder. This was a delightful encounter for it had been a number of years since I had seen a Java Sparrow in the wild. They were visitors in the compound at the Canton Hospital in Canton. On Sept. 18, a bird's nest was reported which we went to see and found near a boulder not far from the stream. It contained 4 eggs of the Violet Whistling Thrush. Early in December a fire was started on the mountain slopes. Its line was followed by groups of the Black-eared Kite and another bird not so large which I took to be a buzzard. They swooped low along the line of fire catching whatever the fire chased.

in the open. Often it seemed as though they would be burned by the flames so daring they were after the prey below.

A complete list is given of the birds seen and heard by the writer, as well as two reported by people in residence in the camp. These last are so indicated in the list.

The records for the summer of 1937 were begun July 31 on a trip up to the camp. Then, largely on account of lack of visibility, no records were made from the mountain top until August 16. A few records have also been taken from notes made in other years.

Birds Seen on Lantau Island

Bulbul, Chinese (*Pycnonotus sinensis sinensis* Gmelin)

July 31-Dec. 16, 1937. Seen at Tung Chung on mountain slopes and heard through the summer from the lower mountain levels.

Bulbul, Red-vented (*Molpastes haemorrhous bermanicus* (Sharpe))

Time not recorded; seen at Tung Chung.

Crow, Collared (*Corvus torquatus* Lesson)

July 31, Tung Chung.

Crow Pheasant (*Centropus sinensis sinensis* (Stephens))

July 31, 1937, at about 1800 ft. level; July 1933, camp site, at about 2450 ft. level.

Cuckoo, Burmese Plaintive (*Coccyzus merulinus querulus* Heine)

No date.

Dove, Chinese Spotted-neck (*Streptopelia sinensis sinensis* (Scopoli))

July 31, 1937, Tung Chung.

Drongo, Chinese Black (*Buchanga atra cathoeca* (Swinhoe))

July 31, 1937, lower mountain slope

Drongo, Southern White-cheeked (*Buchanga leucogenys leucogenys* Walden)

July 1936, Tung Chung.

Francolin, Chinese (*Francolinus pintadeanus pintadeanus* (Scopoli))

Reported in July and August, 1936, on the eastern slope of Lantau Peak.

Hawk, Eastern Sparrow (*Accipiter nisus nisosimilis* (Tickell))

Oct. 15-Nov. 17, 1937, mountain top.

Kingfisher, Little Blue (*Alcedo atthis bengalensis* Gmelin)

July 1936, at seashore along a stream.

Kite, Black-eared (*Milvus lineatus* (Gray))

Sept. 6-Nov. 16, 1937, above the camp.

Magpie, Chinese (*Pica pica sericea* Gould)

- July 1936, Tung Chung; July 1937, Tung Chung.
Magpie Robin or Chinese Dayal Bird (*Copsychus saularis prosthomellus* Oberholser)
- July 1937.
- Myna, Black-necked (*Gracupica nigricollis* (Paykull))**
- Sept. 1936, Tung Chung; July 1937, Tung Chung.
- Myna, Chinese Crested (*Aethiopsar cristatellus cristatellus* (Linnaeus))**
- Seen at Tung Chung each year, on the way to and from camp.
- Shrike, Rufous-backed (*Lanius schach schach* Linnaeus)**
- July 31, Sept. 25, Nov. 20, on mountain; Dec., midmountain level.
- Silver-eye, Chinese (*Zosterops simplex simplex* Swinhoe)**
- July 1936, Tung Chung.
- Skylark, Ruddy (*Alauda arvensis caelivox* Swinhoe)**
- Sept. 23-Nov. 20, 1937, Mountain Camp.
- Sparrow, Chinese Tree (*Passer montanus saturatus* Stejneger)**
- July 16, Dec. 16, Tung Chung. Not seen on the mountain.
- Sparrow, Java (*Oryzornis oryzivora* (L.))**
- Nov. 19, 1937, Oldt Hill Mountain Camp.
- Swallow, Eastern House (*Hirundo rustica gutturalis* Scopoli)**
- Aug. 29-Nov. 15, Mountain Camp.
- Swift, Large White-rumped (*Apus pacificus pacificus* (Latham))**
- Aug. 16-Nov. 15, 1937, Mountain Camp.
- Thrush, Black-faced Laughing (*Dryonastes perspicillatus perspicillatus* (Gmelin))**
- July 31, Tung Chung; Sept. 7, Lantau Mountain Camp.
- Thrush, Chinese Black (*Planesticus merula mandarinus* Bonaparte)**
- 1925-1931; Nov. 3, 1937, camp stream.
- Thrush, Red-bellied Rock (*Monticola philippensis philippensis* (Muller))**
- Nov. 9, 1937, reported by Miss Shoop.
- Thrush, Violet Whistling (*Myophonus coeruleus coeruleus* (Scopoli))**
- Aug. 16-Dec. 3, 1937, mountain peak and valleys.
- Tit, South China Gray (*Parus cinereus commixtus* Swinhoe)**
- July 31 and later, Tung Chung and middle mountain slopes; often heard.
- Wagtail, Gray (*Budytes cinereus caspicus* Gmelin)**

Sept. 23, 25, 29, 1937, Oldt Hill Camp.

Wagtail, White-faced (*Motacilla alba leucopsis* Gould)

Oct. 11, 1937, in camp; Nov. 13, 1938, in camp.

Warbler, Gray-headed Wren (*Burnesia flavigaster sonitans* (Swinhoe))

July 31, mid mountain slopes; often heard.

Birds not Certainly Identified

Buzzard, Rough-legged (*Buteo lagopus pallidus* (Menzbier))

December.

Harrier, Pale (*Circus macrourus* (Gmelin))

Oct. 11, 1937.

Kestral, Eastern (*Falco tinnunculus japonicus* Temminck & Schlegel)

Sept. 24, Oct. 3, flying over mountain peak.

Starling, Silky (*Sturnia sericea* (Gmelin))

July 1936, Tung Chung.

Swinhoe's Minivet (*Pericrocotus cinereus cantonensis* Swinhoe)

Sept. 25, flying over the east peak.

Tailor Bird, Long-tailed (*Orthotomus sutorius longicaudus* Gmelin)

July 1936, Tung Chung.

Birds Seen by Captain Whittaker

Bulbul, Chinese (*Pycnonotus sinensis sinensis* (Gmelin))

Tung Chung.

Bulbul, Red-vented (*Molpastes haemorrhous bermanicus* (Sharpe))

Middle mountain slopes and below.

Crow Pheasant (*Centropus sinensis sinensis* (Stephens))

Tung Chung.

Dayal Bird (*Copyschus saularis prosthopellus* Oberholser)

Tung Chung.

Dove, Chinese Spotted-neck (*Streptopelia sinensis sinensis* (Scopoli))

Pui-O.

Drongo, Chinese Black (*Buchanga atra cathoeca* (Swinhoe))

Pui-O, Tung Chung.

Eagle, White-bellied Sea (*Haliaetus leucogaster* (Gmelin))

Tong Fuk village.

Francolin, Chinese (*Francolinus pintadeanus pintadeanus* (Scopoli))

Between camp and Pui-O.

Heron, Chinese Pond (*Ardeola bacchus* (Bonaparte))

Tung Chung.

Kingfisher, Eastern White-breasted (*Halcyon smyrnensis fusca* (Boddaert))

Tung Chung and Pui-O.

Kingfisher, Little Blue (*Alcedo atthis bengalensis* Gmelin)

Tung Chung.

Kite, Black-eared (*Milvus lineatus* (Gray))

Mountain camp.

Magpie, Chinese (*Pica pica sericea* Gould)

All villages at foot of the mountain.

Magpie, Chinese Blue (*Urocissa erythrorhyncha erythrorhyncha* Boddaert)

At Perfect Pool.

Sandpiper (Species unknown)

Tung Chung.

Shrike, Rufous-backed (*Lanius schach schach* Linnaeus)

Ubiquitous.

Snipe (Species unknown)

Tung Chung.

Sparrow, Formosan Tree (*Passer montanus taiwanensis* Hartert)

Tung Chung.

Starling, Silky (*Sturnia sericea* (Gmelin))

Pui-O village.

Swallow, Eastern House (*Hirundo rustica gutturalis* Scopoli)

Tung Chung.

Tailor Bird, Long-tailed (*Orthotomus sutorius longicaudus* Gmelin)

Tung Chung.

Thrush, Black-faced Laughing (*Dryonastes perspicillatus perspicillatus* (Gmelin))

Perfect Pool.

Thrush, Eastern Blue Rock (*Monticola solitarius pandoo* (Sykes))

Sunset Peak and Rocky Top.

Thrush, Violet Whistling (*Myophonus coeruleus coeruleus* (Scopoli))

All high valleys and streams.

Wagtail, Gray (*Budytes cinereus caspicus* Gmelin)

Oldt Hill in camp.

*Seen but not Certainly Identified*Cuckoo, Eastern (*Cuculus canorus telephonus* Heine)

Slope of Taai Ue Mountain.

Martin, Black-chinned (*Delichon urbica dasypus* Bonaparte)

Tung Chung and above.

Shrike, Eastern Great Gray (*Lanius sphenocercus sphenocercus* Cabanis)

Pui-O village.

Skylark, Ruddy (*Alauda arvensis coelirox* Swinhoe)

Oldt's Hill.

Warbler, Gray-headed Wren (*Burnesia flavigaster sonitans* (Swinhoe))

Nw. slope of Taai Ue Shaan.

Whimbrel, Eastern (*Numenius phaeopus variegatus* (Scopoli))

Pui-O Shore.

Wren, Little Brown Hill (*Pnoepyga pusilla pusilla* Hodgson)

Stream near Tung Chung.

ORA M. OLDT

LINGNAN UNIVERSITY
CANTON, CHINA

爛頭島之鳥類誌

魯恩賜夫人著

嶺南大學

(摘要)

本文所載之鳥類，係根據民國廿四至廿六年之考察，尤以民國廿六年者為多。文中第一名錄，論及鳥類三十七種，係見於爛頭峯之營地，及由海濱至營中之路上。第二名錄則包括三十二種，乃民國廿六年九月見於爛頭島各處者。故於兩名錄中，間有相同之品種焉。

GENERAL NOTES

Seventh International Congress of Genetics

The Seventh International Congress of Genetics will meet in Edinburgh in 1939, probably August 23 to 30, under the presidency of Dr. N. I. Vavilov, Director of the Institute of Plant Industry, Leningrad, U.S.S.R. Detailed plans are not yet worked out but it is planned that at the plenary sessions invited speakers will discuss selected topics such as Animal and Plant Breeding in the light of Genetics, Certain Aspects of the Gene and Chromosome Theory, Polyploidy and Hybridization in Plants, Human Genetics, Properties of the Chromosome. There will probably be sectional meetings dealing with Animal Breeding, Plant Breeding, Physiological Genetics, Human Genetics, Gene and Chromosome, Theory and so forth. There will be the usual run of demonstrations, public lectures, official receptions, and probably a pre-Congress tour. For information, those interested may communicate with F. A. E. Crew, Esq., Institute of Animal Genetics, West Mains Road, Edinburgh 9, Scotland.

Seventh World's Poultry Congress

The Seventh World's Poultry Congress will be held in Cleveland, Ohio, July 28 to August 27, 1929.

American Documentation Institute

and

Extension of Biblio film Service

The well known non-profit biblio film service for copying research materials, which has for some time been employed in cooperation with the U.S. Department of Agriculture Library, has now been extended to the Army Medical Library, and to the Library of Congress. Operation of Biblio film Service is one of the several important activities of the American Documentation Institute, a non-profit society formed in 1937 by fifty learned societies and other organizations for the promotion and development of documentation in scholarly and scientific fields. Another activity of the Institute is an auxiliary publication service whereby editors of journals, proceedings, bulletins, etc., may make arrangements to have published in microfilm or other form papers of which the editors' budgets allow printing only a summary. Books, theses, and monographs may also be published on a non-profit basis. Still another function of the Institute is the "at-cost" copying of non-published material. The rate for copying in microfilm form (if no technical difficulties are involved) is a service charge of 20 cents per item, plus 1 cent per page; for 6x8 inch photoprints (readable without optical aid) a service of twenty cents per item, plus ten cents per page. An item is a book or a number of a periodical. No current printed material is copied; nothing is copied in lieu of purchase or subscription. In addition to articles and special publications, reprints of whole books in the case of the classics of science such as Darwin's "Origin of Species" and Hooke's "Micrographia", are available. The American Documentation Institute may be addressed: Offices of Science Service, 2101 Constitution Ave., Wash., D.C. The address of the biblio film service is: Biblio film Service, care of the U.S. Department of Agriculture Library, Wash. D.C.

Scientific Etiquette

We usually take it for granted that a scientist knows and observes a number of practices which are collectively referred to as constituting "scientific etiquette". In the case of scientific papers it is expected that there will be an indication of whether the work is original or compiled and that proper credit will be given to works which have been consulted. In taxonomic papers the writer's conduct is (or should be), in many cases, governed by International Rules, but many of the practices observed in scientific work and publication have become established by common consent and usage. Failure to observe these established practices marks the author as ignorant or arrogant, or both. It is not necessary to enumerate the items we have in mind for we must assume that if the scientist has been properly trained information on these points have constituted a part of his training. However, one particular disregard for established practice has come to our attention so forcibly that we think a service may be rendered by calling attention to it. We refer to the matter of submitting manuscript to two or more journals simultaneously. In our experience this evil practice has taken three different forms. The less common but more offensive form is where the paper is sent to two journals simultaneously along with covering letters to the editors so designed as to secure (force?) almost immediate publication by one journal, probably in competition with the other. Each editor concerned is informed by receiving a carbon copy of the letter sent the other editor. We know of cases of this sort where the articles were rejected by both journals, a commendable procedure. A second form of this racket is to await publication or notice of acceptance by one journal, then inform the second journal that the paper had been sent to two journals simultaneously and now that journal "A" was publishing the article Journal "B" would not need to publish it "unless it wants to". In this case the author apparently considers his contribution so valuable that duplicate publication does not bother his conscience. The third form of "carelessness" in this respect is the situation wherein the editors of the journals concerned are never informed of the duplication. This practice is bad enough when the article is published in one language in one journal and in another language in a second journal, but in a number of cases the article is published in the same language in the two journals. Of course there are some journals which do not specify that articles offered to them are to be original contributions or offered solely to them; the present remarks do not apply to these journals. In closing we must remind offenders in this regard that irregular procedure of this sort makes readers skeptical about the quality of the paper, it reflects on journals which purport to publish only original articles, it occasions a waste of money, and it clutters up an already over-burdened literature with useless references.

BOOKS AND SPECIAL PUBLICATIONS

PUBLIC WORKS ENGINEERS' YEARBOOK, 1938, FRANK W. HERRING
Executive Director, viii and 482 p., 3 fig., cloth, Chicago, Ill., U. S. A.,
American Public Works Association, 1938.

In the first part of this book a comprehensive review is given of events and developments in public works in 1937 in the United States. The review is divided into three subsections: Public Works Administration, Financing Public Works, and Public Works Engineering. Some current problems in public works are discussed in Part II. Many of these problems will be found of general interest. They are: Public works personnel problems, Planning problems of the smaller city, Administering public services during a great flood, Needed research in concrete pavements, Needed research in bituminous pavements, Needed research in brick pavements, Sewage disposal in Atlanta, Birmingham's industrial water supply, Atlanta's refuse incinerator, The collection of refuse, Rates for small municipal utilities, Specification for stabilized wearing courses, Specification for materials for stabilized base course. The last part of the book is taken up with business proceedings of the Association.

E. C. WELLS

THE FAUNA OF BRITISH INDIA, INCLUDING CEYLON AND BURMA, MOTHS, Vol. V, SPHINGIDAE, by T. R. D. BELL and F. B. SCOTT, xv and 537 pages, 124 text fig., 15 (12 colored) plates, and a map of the Indian Empire and Ceylon, Taylor and Francis, Ltd., London, E.C. 4, June 15, 1937.

The present volume may be considered as a complete monograph of the whole faintly Sphingidae as known to exist in the Indian Empire. The authors have brought together information which has been published in previous works, supplemented by the results of their own studies, and have paid especial attention to the immature forms and life-history and habits. In short, technical and non-technical descriptions and illustrations are given for the adults and also for the immature forms. If the habits of a given species are known, they are given in great detail and the different instars carefully and fully discussed. This work is indispensable for students of taxonomy or life-history in regions having essentially the same fauna. In addition to the systematic section on pages 42 to 492 (183 species, excluding subspecies, are treated), there are: a glossary of terms which are commonly used in the descriptions; a general introduction to the morphology of immature forms and adults, habits, and distribution; bibliography; appendix A (showing the Kanara District of South India and its topography and flora in relation to the distribution of the Sphingidae); appendix B (giving a list of the 135 species and subspecies of which the food-plants are known along with the names of the food-plants); an alphabetical index; colored plates illustrating most of the caterpillars and pupae.

Y. C. Ng

FLOWERING SHRUBS AND TREES, SECOND TWENTY, by G. A. C. HERKLOTS, 45 pages, 20 photographs on 11 plates, 25 figures, Hong Kong Nature Series, published by the author, The University, Hong Kong, 1938, \$2.50 H.K. cy.

This excellent little booklet is a companion volume to the one reviewed earlier (*Ling. Sci. Jour.* 14(4):640, 1937). The flowering trees and shrubs are arranged by families rather than alphabetically as was the case in the

"First Twenty." While nineteen of the species have been treated at some length in the *Hong Kong Naturalist*, sixteen of the photographs and nine of the text figures have been prepared especially for this work. Eight families are represented by the species treated which are as follows: *Desmos cochinchinensis* Loureiro, *Uvaria microcarpa* Champion, *U. purpurea* Blume, *Artobotrys odoratissimus* R. Br., *Gordonia anomala* Spreng., *Tutcheria spectabilis* Dunn., *Rhodoleia championi* Hooker, *Eustigma oblongifolia* Gardn. & Champ., *Melastoma cundidum* Don, *M. sanguineum* Sims, *M. repens* Desr., *Enkianthus quinqueflorus* Loureiro, *Caesalpinia sepiaria* Roxburgh, *C. nuga* Aiton, *C. vernalis* Champion, *C. kwangtungensis* Merrill, *C. bonducella* Linnaeus, *Dichroa febrifuga* Loureiro, and *Ixora chinensis* Lam. The six species of *Caesalpinia* which are treated are keyed out as to (1) pods and leaves, and (2) flowers, preceded by illustrations of one primary pinna of each species. There is a glossary of the thirty technical terms used in the booklet. The plates are excellent and are done on a good quality art paper.

W. E. H.

ABSTRACTS AND REVIEWS

An attempt is made to notice, abstract, or review articles and publications dealing with the biological and physical sciences in China. Articles in these fields which do not pertain specifically to China but contain information of interest and value to scientists and others in China are also included. Although this abstract service is maintained primarily for the benefit of people in China (where scientific literature is not plentiful) it is hoped that it will also be of service to those in other countries who are interested in following the progress of science in China.

Obviously we can make mention of or abstract only such literature as comes to the attention of the editors who, accordingly, will appreciate receiving literature for this purpose. Literature thus received is placed in Lingnan University Library.

Airy-Shaw, H. K. [Descriptions of various species] in *Curtis's Bot. Mag.* 160, pts. 2 and 3, 1937.—There are discussed and described in English and illustrated in color *Lyonia macrocalyx* (Anth.) Airy-Shaw comb. nov., (*Pieris macrocalyx* Anth.) (pl. 9490) from S. E. Tibet and N. W. Yunnan, and *Distylium racemosum* Sieb. & Zucc. (pl. 9501) from Japan, Quelpaert Is., Formosa, Liu Kiu Is., Hongkong, (and ? Fukien). E. H. WALKER

Alexander, Charles P. New or little-known Tipulidae from eastern Asia (Diptera). *V. Phil. Jour. Sci.* 40(4):519-546, 2 pl., 1929.—The limits of the large and involved genus *Limonia* Meigen are discussed. The 19 subgenera are characterized and there are a key to species and descriptions of many new species.

Allen, C. K. Studies in the Lauraceae. I. Chinese and Indo-Chinese species of *Litsea*, *Neolitsea*, and *Actinodaphne*. *Ann. Missouri Bot. Gard.* 25 : 361-434, 1937.—The genera of Lauraceae are frequently differentiated from one another with great difficulty. Although this paper does not promise anything more final, since it is dealing with the species of a limited area, it is a forerunner of other papers in which, it is predicted, this uncertainty will be removed. Among the 95 species here treated are several new species and varieties. E. H. WALKER

Allen, Glover M. Carnivora from the Asiatic expeditions. *Amer. Mus. Novitates* 360:1-14, 1929.—Critical reviews are given of two representatives of Ursidae, 7 Canidae and 7 Felidae.

Allen, Glover M. Mustelids from the Asiatic expeditions. *Amer. Mus. Novitates* 358:1-12, 1929.—Over 140 skins of mustelids were collected by the American Museum Expeditions, chiefly in Yunnan, Szechwan and Fukien Provinces and a few in Mongolia. Fourteen species and subspecies are represented in the collection. Descriptive notes are given on each. *Helictis taxilla sorella* from Futsing, Fukien, is new to science.

Allen, Glover M. Viverrids from the Asiatic expeditions. *Amer. Mus. Novitates* 359:1-9, 1929.—Over 200 skins of civet cats were taken from S. China, particularly from Hainan, Fukien, and Yunnan Provinces. Six species are represented. Range of individual, sexual, and geographical variation are discussed for each.

Ballard, F. *Viburnum foetidum*. *Curtis's Bot. Mag.* 160 : pl. 9509, 1938.—This native of India, Yunnan, and Szechwan is illustrated in color and described in English. E. H. WALKER

Balthasar, Vladimír. Ctyrty doplnek k čeledi Scarabaeidae palearktické oblasti *Casopis Československe Společnosti Ent.* 26(5-6):97-100, 1929.—Included is *Anomala luculenta* Er. n. ab. *cyanoviolacea* from Manchuria.

Balthasar, Vladimír. Deset novych palearktickych forem z čeledi brouku listorohych. (Zehn neue palearktische Formen aus

der Familie der Lamellicornien.) (In Czech and German.) *Casopis Ceskoslov. Spolecnosti Ent.* 25(5-6) :112-116, 1928 (1929).—*Pachnotosia brevifarsis* Lew. ab. n. *violacea* is from Manchuria.

Barkley, F. A. Studies in the Anacardiaceae II. *Ann. Missouri Bot. Gard.* 24 : 499-500, 1937.—In this part (which was reviewed in *Ling. Sci. Jour.* 16 : 512-513, 1937) the author corrects the nomenclatural error in part I in which *Ailanthus peregrina* (Buc'hoz) Barkley was proposed and accepts *A. altissima* (Miller) Swingle with a new list of synonyms. E. H. WALKER

Barovskij, V. Cantharidides asiatiques nouveaux (Coleoptera). IV. *Revue Russe d'Ent. [Moscow]* 23(3-4) :266-269, 1 fig., 1929.—*Rhagonycha przewalskii* n. sp. is from Mongolia. FROM BIOLOGICAL ABSTRACTS

Bellio, G. Descrizione di un nuovo genere di Diaspinae (Hemiptera : Coccoidea) dell' Estremo Oriente. *Boll. Lab. Zool. Gen. e Agraria Portici* 22 :159 165, 4 fig., 1928-1929.—*Silvestraspis*, n. gen. near *Leucaspis*, is erected for *S. sinensis* from Mt Kusang, near Foochow.

BIOLOGICAL ABSTRACTS

Berg, L. S. Zoo-geographical divisions for Far Eastern fresh water fishes. *Proc. 3rd Pan-Pacific Sci. Congr., Tokyo* 1 : 1041-1043, 1926 (1928).—The Far East belongs partly to the Holarctic region, partly to the Sino-Indian, Southern Japan and the Amur Basin belong to the Amuro-Japanese intermediate region. The circumpolar subregion is divided into the North Polar Sea province and the Pacific province. Characteristic fresh-water fishes of these various regions, subregions, and provinces are listed. The Amur subregion shows a remarkable relationship to the Mediterranean fauna.

BIOLOGICAL ABSTRACTS

Bernhauer, Max. Neue Kurzflugler des palaarktischen Gebietes. *Koleopterol Rundsch.* 14(5-6) :177-195, 1929.—Many new genera and species are described. *Bledius sauteri* v. *sparsior* n. var. is from China.

FROM BIOLOGICAL ABSTRACTS

Bey-Bienko, G. J. Studies on the Dermaptera and Orthoptera of Manchuria. *Konowia* 8(2) :97-110, 3 fig., 1929.—A study was made of a collection of nearly 200 specimens, "representing 39 species and races, of which one belongs to the Dermaptera, two to the family Blattidae, of the order Orthoptera, 3 to the family Tettigoniidae, 3 to the family Gryllidae and 30 to the family Acrididae." Species recorded from Manchuria by previous workers and a few related species not yet recorded from Manchuria are listed.

Boselli, F. G. Studii sugli Psyllidi. 2. Descrizione di una nuova specie di *Paurocephala* della Cina e dei suoi stadii larvali. *Boll. Lab. Zool. Gen. e Agraria [Portici]* 21 : 251-264, 5 fig., 1928.—*P. chonchiae* n. sp. is from Fu Chow, Kusang, on *Ficus* sp. Descriptions of the egg, of the 4 larval stages, and of the nymph are given.

F. B. BOSELLI in BIOLOGICAL ABSTRACTS

Byhouwer, J. T. P. An enumeration of the roses of Yunnan. *Jour. Arn. Arb.* 10(2) :84-107, 1929.—Locality records are given on 34 species, varieties and forms of *Rosa*. A number of double-flowered garden roses which could be identified only partly with known forms were collected. *R. praelucens*, n. sp., *R. rugosa* var. *Chamissoniana* f. *plena* Byhouwer, n. comb. for *R. r. var. plena* Regel, are described.

Chamberlin, Joseph Conrad. A synoptic classification of the false scorpions or chela-spinners, with a report on a cosmopolitan collection of the same. Part II. The Diplosphyronida (Arachnida-Chelothethida). *Ann. & Mag. Nat. Hist.* 5(25) : 1-48, 3 pl.; 30 : 585-620, 1930.

—Keys are given to families, genera and species. Each species is described with a discussion of synonymy and distribution. Many new species are described. The following are recorded from China: *Microcreagris silvestris* n. sp., from Yehihuan; *Microcreagris formosana* Ellingsen., from Formosa; *M. lampra* n. sp., from Kusang; *M. orientalis* n. sp., from Lookay.

Chang, C. Y. A new *Xenorylon* from North China. *Bull. Geol. Soc. China* 8(3):243-251, 1 pl., 7 fig., 1929.—This is the first study undertaken on a Chinese fossil plant by use of thin sections. The wood studied was from the Upper Jurassic of Hopei Province and represents the new species *X. hopeense*.

Chang, T. P., 張宗藻 A new species of Jassidae. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7(6):211-219, 1 pl., 6 fig., 1938.—The new species *Bothrognathus hui* is described and figured from specimens collected in the Western Hills, near Peiping. It is allied to *B. gardineri* Dist.

Chen, Luetta. New species of *Bauhinia* from China. *Jour. Arn. Arb.* 19(2):129-133, 1938.—The following new species are characterized: *B. Bohniana*, *B. caterviflora*, *B. chalcophylla*, *B. euryantha*, and *B. pernervosa*, all from Yuunan; *B. didyma* from Kwangtung, and *B. hainanensis* Merrill & Chun from Hainan I.

Cho, Y. On the koa-sugar cane. (In Japanese with English title.) *Formosan Agri. Rev.*, No. 377, p. 322-335, 4 fig., 1938.

Clark, Austin Hobart. A monograph of the existing crinoids. Vol. 1. The comatulids. Part 3. Superfamily Comasterida. *U. S. Nat. Mus. Bull.* 82, 816 p., 82 pl., 1931.

Copeland, Edwin Bingham. *Leptochilus* and genera confused with it. *Phil. Jour. Sci.* 37(4):333-416, 32 pl., 52 text fig., 1928.—A monographic revision is given of the genus *Leptochilus* Kaulfuss and of the related oriental genera *Campilum* Presl, *Hemigramma* Christ, and *Quercifilix* Copeland. The last is a new genus based on *Q. zeylanica* (Houttuyn) Copeland, n. comb., for *Ophioglossum zeylanicum* Houttuyn. Its range includes Formosa. Keys are given for the 52 species of *Campilum*. Two species are recorded from Hainan, 2 from Indo-China, 3 from China, 2 from Formosa and 1 from Hoi gkong.

Corti, A. Studien über die Subfamilie der Agrotinae (Lep.). XIX. *Deutsche Ent. Zeitsch. "Iris"* 42(4):320-328, 1 pl., 1928.—*Euxoa fraudulenta* of north Tibet and *E. astuta* from China are described. There are notes on 5 other species of *Euxoa* and 2 of *Feltia*.

FROM BIOLOGICAL ABSTRACTS

Craib, W. G. (Edited by A. F. G. Kerr.) *Florae Siamensis enumeratio*. A list of the plants known from Siam with records of their occurrence. Vol. 2, part 4, p. 311-393, Siam Society, Bangkok, 1938.—In this section of the series the following families are treated: Vacciniaceae, Ericaceae, Monotropaceae, Epacridaceae, Plumbaginaceae, Primulaceae, Myrsinaceae, Sapotaceae, Sarcospermaceae, Ebenaceae, Symplocaceae, and Sterculiaceae. For each species are given bibliographical references, locality records in Siam, distribution elsewhere, and local name. Many species listed are also represented in China.

Croizat, Leon. Notes on Chinese Euphorbiaceae. *Jour. Arn. Arb.* 19(2):134-148, 1938.—*Antidesma hainanense* Merr. and 20 species and varieties of *Mallotus* Lour. are treated. New concepts are: *Mallotus barbatus* Muell.-Arg. var. *pedicellaris* n. var., from Szechwan; *M. nepalensis* Muell.-Arg. var. *kwangtungensis* n. var., from Kwangtung; *M. tenuifolius* Pax var. *floccoatus*

(Muell.-Arg.) n. comb. for *M. oreophilus* β *floccosus* Muell.-Arg.; *M. tenuifolius* Pax var. *subjaponicus* n. var., from Fukien; *M. Lianus* n. sp., from Kwangtung; *M. repandus* (Willd.) Muell.-Arg. var. *megaphyllus* n. var., from Indo-China and Yunnan; *M. illudens* n. n. for *M. repandus* sensu Hutch.; *M. Millietii* var. *atricha* n. var., from Kwangsi. The geographical background of *M. repandus*, *M. illudens*, *M. chrysocarpus*, and *M. Millietii* is given.

Dandy, J. E. *Magnolia globosa*. *Curtis's Bot. Mag.* 159, pl. 9467, 1936.—A colored drawing and discussion and description in English of this cultivated species originally from the eastern Himalayas, southeastern Tibet and northwestern Yunnan.

E. H. WALKER

Denis, J. R. Notes sur les Collemboles recoltes dans ses voyages par le Prof. F. Silvestri (Descriptions d'espèces nouvelles). I. Collemboles d'Extreme-Orient. *Boll. Lab. Zool. Gen. e Agraria [Portici]* 22:166-180, 7 fig. 1928-1929.—*Onychiurus fimetarius* f. *denticulata* n. f. is from Peking; *Paranurophorus simplex* n. gen. & sp., in Entomobryidae, from Yunnan; *Sira formosana* n. sp. from Formosa. *Sinella straminea* (Folsom) is redescribed.

BIOLOGICAL ABSTRACTS

Denis, J. R. Notes sur les Collemboles recoltes dans ses voyages par le Prof. F. Silvestri. I. Seconde note sur les Collemboles d'Extreme-Orient. *Boll. Lab. Zool. Gen. e Agraria [Portici]* 22:305-320, 11 fig. 1928-1929.—*Achorutes hypostoma* n. sp., *Homidia sauteri* f. *sinensis* n. f., *H. socia* n. sp., *H. transitoria* n. sp., *Sinella monoculata* n. sp., *Lepidocyrtus hankoui* n. sp., *Cremastocephalus yunnanensis* n. sp., *Tomocerus folsoni* n. sp., *Orchesella sinensis* n. sp., and *Ptenothrix mirabilis* n. sp. are from China. *Onychiurus formosanus* n. sp. is from Formosa.

BIOLOGICAL ABSTRACTS

Draeske, Joh. Die Schmetterlinge der Stotznerschen Ausbeute. *Deutsche Ent. Zeitschr. "Iris"* 42(4):297-320, 1928.—Ten new species, 3 new subspecies and one new variety are described from China.

Duda, Oswald. Beitrag zur Kenntnis der aussereuropäischen Scatopsiden (Dipt.). *Konowia* 7(4):259-297, 1 pl., 25 fig., 1928.—*Aldrovandiella formosana* n. sp. is described from Formosa.

Esaki, Teiso. Verzeichniss der Hemiptera-Heteroptera der Insel Formosa. *Ann. Hist. Mus. Nation. Hungarici* 24:136-189. map, 1926.—A systematic list is given of 326 species from the island.

Ewing, H. E. Two new genera and one new species of Siphonaptera. *Proc. Ent. Soc. Washington* 40(4):83-95, 1938.—*Micropsylloides*, related to *Micropsylla* Dunn & Parker, is based on *Rhadinopsylla jaonis*, which was described by Jordan in 1928, from China.

Fedde, F. Adnotaciones ad species formosanas generis *Corydutis* I. *Rept. Sp. Nov. Fedde* 41: 144, 1936.—Critical notes on *C. formosana* Hayata and *C. orthocarpa* Hayata and their relatives.

E. H. WALKER

Fedde, F. Deckblätter. XV. *Rept. Sp. Nov. Fedde* 42: 267-268, 1937.—Consists largely of the reductions of Léveillé's species in R. E. Woodson: A revision of the Asiatic species of *Trachelospermum* (*Sungatsenia* 3: 65-105, 1936); F. P. Metcalf: Two new species of *Celtis* from Fukien (op. cit. 3: 112-115, 1936); and Y. Tsiang: Notes on the Asiatic Apocynales. III (op. cit. 3: 121-239, 1936). Reductions of three of Léveillé's species of *Lilium* described in Fedde's *Repertorium* are noted.

E. H. WALKER

Forsius, Runar. Tenthredinoiden aus China eingesammelt von Herrn Dir. Kj. Kolthoff 1921. *Arkiv Zool. [Stockholm]* 19A (2, No. 10): 1-12, 1927.—*Tremex pandora* Westw. and 16 species of Tenthredinidae are treated. *Arge kolthoffi*, *Caliroa angustata*, *Selandria sinensis*, *Stromboceros sinensis*, and *Allantus kolthoffi*, all new species, are described.

Fowler, Henry W. Notes on Japanese and Chinese fishes. *Proc. Acad. Nat. Sci. Philadelphia* 81 : 589-616, 2 fig., 1929.—Notes with measurements and, in some cases, detailed descriptions are given of fish observed in the markets in Japan, Shanghai, and Hongkong.

Friend, Hilderic. Horticulture in relation to commerce. V. China's gifts to the world. *Gard. Chron. [London]* 87 (2261) : 328, 1930.

Furtado, C. X. The nomenclature of types. *Gard. Bull. Straits Settlements* 9(3) : 285-309, 1937.—An excellent and exhaustive monograph on type terminology. The author discusses primary types (proterotypes), secondary types (heterotypes) and duplicate types (antitypes). These include holotypes, paratypes, syntypes, lectotypes, apotypes, topotypes, icotypes, neotypes, ideotypes, merotypes, isotypes, haplotypes, clonotypes, spermotypes, and clastotypes. Detailed discussion and also cited examples are given for each type, so that each is clearly presented. Some space is given to the importance of labeling type plants in gardens and in Herbaria. This is a valuable contribution to a subject which in practice is often very poorly defined and understood. Only recently has there been any concerted effort for uniformity among taxonomists.

F. P. METCALF

Gates, G. E. On a new species of the moniligastrid genus *Desmogaster* from China. *Ann. & Mag. Nat. Hist.* 6(35) : 580-593, 1930.—*D. sinensis* is described. Only 6 species of *Desmogaster* have been described previously.

BIOLOGICAL ABSTRACTS

Giesen, H. Triuridaceae. In *Das Pflanzenreich* 104 (IV. 18) : 1-84, pl. 1-3, fig. 1-18, 1938.—Only two genera, *Andrurus* and *Sciaphila*, and about 6 species of this widely distributed pantropic family are recorded as occurring in China and Japan including Formosa. *Andrurus japonica* is a transfer of *Sciaphila japonica* Makino. The five remaining species of *Sciaphila* are considered as "Species incertae." E. H. WALKER

Gilmour, J. S. L. *Catalpa Fargesii* forma *Duclozii*. *Curtis's Bot. Mag.* 159, pl. 9458, 1936.—This native of Hupeh, Yunnan, and Szechwan, first described by Dode as a species, is here considered merely a form of the species described by Bureau. It is illustrated in color and described in English.

E. H. WALKER

Gordon, Isabella. Seven new species of Brachyura from the coasts of China. *Ann. & Mag. Nat. Hist.* 6(34) : 519-525, 1930.—*Pugetinia cristata*, *Charybdis barneyi*, *C. sinensis*, *Pilumnus penicillatus*, *P. sinensis*, *Litocheira amoyensis*, and *Metaplaax shensi* are described.

BIOLOGICAL ABSTRACTS

Hao, Kin-shen, 郝景盛. Plantae novae Sinicae. III. *Rept. Sp. Nov. Fedde* 42 : 83-86, 1937.—Descriptions of the new species *Diarrhena sinica* from Chekiang, *Leersia sinensis* from Honan, Hupeh, and Kiangsu, *Illigera yaoshanensis* from Kwangsi, *Clethra Sleumeriana* from Hunan, and *C. sinica* from Kweichow, Hunan, Kiangsi, and Chekiang. E. H. WALKER

Heding, S. G. Synaptidae. (Papers from Dr. Th. Mortensen's Pacific Expedition 1914-16. XLVI.) *Vidensk. Meddel. Dansk naturhist. For. København* 85 : 105-323, 2 pl., 69 fig., 1928.—This paper deals with Synaptidae collected by Dr. Th. Mortensen on his different expeditions. The collection includes 92 different forms, 3 of which are described as new varieties. Of the 89 species described, 47 are new to science, and 10 are old species which are removed from synonymy. Various species are recorded from the Kei Islands. *Synaptula stergreni* n. sp. is from the China Sea and *Protankya magnihamula* n. sp. from Hong Kong.

Hervé-Bazin, J. Syrphidae de Chine. Description de quatre *Chilosia* nouveaux. *Encyclop. Ent. Ser. B. Diptera* 5 : 93-99, 12 fig., 1929.—*Chilosia dispar*, *C. parachloris*, *C. difficilis*, and *C. antennalis* are described from China.

BIOLOGICAL ABSTRACTS

Hsu, H. F., Du, S. D., and Chow, C. Y. On two species of trematodes from the liver of the cat in China. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1) :1-8, 1 pl., 1 fig., 2 tab., 1938.—*Microtrema truncatum* Kobayashi is recorded from the cat for the first time. *Metorchis* sp. is redescribed and its nomenclature is discussed. Measurements are given for both species.

Hu, H. H. Two new species of *Carpinus* from Szechuan. *Jour. Arn. Arb.* 10(3) :154-156, 1929.—*C. Fangiana* and *C. Wilsoniana* are described. Both are allied to *C. cordata* Blume. The former is based on W. P. Fang, no. 1351, type. The latter, is based on W. P. Fang, no. 2685, type.

Hubbard, C. E. *Allium cyaneum*. *Curtis's Bot. Mag.* 160, pl. 9483, 1937.—This species from Kansu, Shensi, Hupeh, and Szechwan is discussed and described in English and illustrated in color. E. H. WALKER

Hubbard, F. T., and Marquand, C. V. B. [Eastern Asiatic species] in *Hook. Icon. Pl.* 34, Ser. V, vol. 4, parts 1, 2, 1936-37.—In a treatment of the grass genus *Thaumastochloa* accompanying plates 3313 and 3314, which illustrate Australian species, Hubbard transfers *Pheum cochinchinensis* Lour., native from Formosa and the Philippines through southern China and south eastern Asia to India. A "Key to the genera of the Eragrostaceae" by Hubbard follows the description of a new African grass accompanying plate 3319. Marquand (pl. 3330) describes the new species, *Gentiana tetrasticha* and *G. Vernayi*, from Tibet collected by C. S. Cutting and A. S. Vernay.

E. H. WALKER

Hutchinson, J. [Descriptions of rhododendrons] in *Curtis's Bot. Mag.* 159, pt. 4, and 160, pts. 1-3, 1937.—The following eastern Asiatic and Tibetan species are described and discussed in English and illustrated in color: *R. crinitigerum* Fr. (pl. 9464), Tibet and Yunnan; *R. Meyrichii* Maxim. (pl. 9475), S. Japan and Quelpaert Is., Korea; *R. niphargum* Balf f. & Ward (pl. 9480), Yunnan; *R. kongboense* Kingdon-Ward (pl. 9492), Tibet; and *R. desquamatum* Balf. f. & Forr. (pl. 9497), Tibet. E. H. WALKER

Irukayama, S. On the agricultural management in Formosa (In Japanese with English title.) *Formosan Agri. Rev.*, No. 377, p. 276-306, 1938.

Issiki, Syuti. Two new species of scorpion flies (Insecta, Order Mecoptera). *Ann. & Mag. Nat. Hist.* 7(38) :219-222, 2 fig., 1931.—*Bittacus sinicus* (Bittacidae) is described from Szechwan.

Issiki, Syuti T. New Japanese and Formosan Microlepidoptera Ann. & Mag. Nat. Hist. 6(34) :422-431, 1930.—Among the new species described are *Tortyra angustistrata*, *Brenthia formosensis*, and *Eriocotus flavicephala* from Formosa. FROM BIOLOGICAL ABSTRACTS

Jao, Chin-chih. New Zygynataceae collected in China. *Amer. Jour. Bot.* 23(1) :53-60, 37 fig., 1936.—Fifteen species of *Spirogyna* and 2 of *Mougeotia* are described as new to science. Most of the species are from the vicinities of Chungking and Kiangpei, Szechwan. Some are from Hopei and Chekiang Provinces and from Peiping.

Jedlicka, Arnost. Novi palearktici Carabidi (IV). (Neue palearktische Carabididen (IV. Folge).) (In German.) *Casopis Ceskoslov. Spolecnosti Ent.* 25(5-6) :103-106, 1928 (1929).—*Taphoxenus Staudingeri* n. sp. is from Fukiang-Kansu.

Johnston, Ivan M. Studies in Boraginaceae. VII. *Contr. Gray Herb. Harvard Univ.* 81:3-83, 1928.—For the most part S. Amer. species of *Heliotropium* are discussed. Among miscellaneous species *Microula rockii* n. sp. is described from Tibet.

Kat, Shigemoto. On the affinity of the cultivated varieties of rice plants, *Oryza sativa* L. *Jour. Dept. Agri., Kyushu Imp. Univ.* 2 (9):241-276, 1930.—Based on morphology, varieties of cultivated rice are divided into two types, regarded as new subspecies *O. sativa* ssp. *indica* and *O. s. ssp. japonica*. Varieties indigenous to Japan proper and Korea belong to the *japonica* type, those of Formosa, southern China, India, Java, and other countries mostly belong to the *indica* type. Some varieties of *japonica* are found in central China. Hybrids between varieties of the different types are not as fertile as those of the same type. In cross hybrids pollen abnormality is manifest following division of the pollen mother-cell.

FROM BIOLOGICAL ABSTRACTS

King, Sohtsu G. Notes on the fossil shells of the Sanmen series. *Bull. Geol. Soc. China* 5(2):157-159, 1926.—Shells were taken from the alluvial plain at Tientsin and from the Hwai Lai basin. *Lamprotula antiqua* n. var. *elongata*, *L. paohoensis*, *L. tinge*, and *Cuneopsis borbouri*, all n. species of the Neocene, and *C. nanzinensis*, n. living species, are described.

Kiritschenko, A. N. Hemiptera-Heteroptera of the Third Mount Everest Expedition, 1924, I. *Ann. & Mag. Nat. Hist.* 7(40):362-385, 1931.—Five species are reported in Pentatomidae (all from Tibet), 1 in Coreidae (Tibet), 15 in Miridae (4 Tibet, 11 Sikkim), 1 in Pyrrhocoridae (Tibet), 1 in Reduviidae (Sikkim), and 4 in Miridae (3 Sikkim, 1 Tibet). The following new species are from Tibet: *Eusarcoris trigonus*, *Pentatomus (Mesoliogaster) hingstoni*, n. sp. and subg., *Acanthosoma chianum*, *Coriomeris nebulivagus*, *Spilostethus oreophilus*, *Geocoris chinai*, *Trapezonatus aeneiventris*, and *Chlamydatus pachycerus*.

Kobuski, C. E. Studies in Theaceae. III. *Eurya* subgenera *Euryodes* and *Penteurya*. *Ann. Missouri Bot. Gard.* 25: 299-359, 1937.—This is the third of the author's projected monographs of this family. His first treatment dealt with the only other subgenus of *Eurya*, *Ternstroemiopsis*, and was published in the *Journal of the Arnold Arboretum* 16: 347-352, pl. 153, 1935. The second paper dealt with the genus *Cleyera* (see op. cit. 18: 118-129, pl. 201, 1937). This paper contains a brief historical sketch, a key to the subgenera, separate keys to the species of four geographic areas (1. China, Indo-China, and Ceylon; 2. Japan, Korea, Formosa and Riu Kiu Islands; 3. Philippine Islands; and 4. New Guinea), and critical treatments of all species including several new species, varieties, and combinations from China.

E. H. WALKER

Kôno, Hiromichi. Die Curculioniden, schädlich an Sachalintannen und Ezofichten. *Ins. Matsumurana* 12(2-3):143-146, 1 text fig., 1938.—Eleven species of Curculionidae are listed from *Abies sachalinensis*, *Picea jezoensis*, and *P. Grehni*. Four of the species are also from Korea, while one of them, *Coelosternus tamanukii* is described and figured as new. The last named species is closest to *C. electus* Roelofs.

Kôno, Hiromichi. Neue und wenig bekannte Ipiden als Schadlinge an Sachalintannen und Ezofichten in Hokkaido. *Ins. Matsumurana* 12(2-3):64-73, 5 text fig., 1938.—Twenty-five species of Ipidae are listed including two new species. Nine tribes are represented. Two of the species, *Dryocoetes hectographus* Reitter and *Xyleborus germanus* Blandford also occur in Korea.

W. E. H.

Kreczetovicz, V. I., and Lucznik, Z. I. Some sedges new to the south-Ussuri region. (In Russian with English summary.) *Trans. Far*

East. Br. Acad. Sci. USSR Tom II, p. 887-895, 4 fig., 1937.—The authors report two Manchurian species of sedges from the Far East, which as yet have not been indicated in the Flora of USSR, viz. *Carex leviissima* Nakai and *C. micrantha* Kük. and establishes two species new to caricology—*C. squamigera* V. Krecz. et Lucznik and *C. pergrandis* V. Krecz. et Lucznik in the South-Ussuri Region.

AUTHORS' SUMMARY

Kukenthal, Georg. Plantae sinensis a Dre. H. Smith annis 1921-22 lectae. XXII. Cyperaceae. *Acta Horti Gothoburg.* 5:33-49, 1939.—One species of *Kyllingia*, 8 of *Cyperus*, 2 of *Heleocharis*, 1 of *Fimbristylis*, 7 of *Scirpus*, 8 of *Cobresia*, and 47 of *Carex* are discussed with locality records. In some cases varieties of various species are treated. Nine new species, 1 new subspecies and 9 new varieties are described. Three of the plants are from Yunnan, 23 from Chili, and 59 from Szechwan.

Kurosawa, M. Descriptions of four new thrips from Japan. *Kontyu* 11(3):266-275, 1 pl., 2 fig., 1937.—The species described include *Frankliniella litavora*, infesting lily-bulbs in Japan, Korea, Manchuria and China.

FROM REV. APPL. ENT.

Lang, M. C. [The experiments with soil of Ruchu.] *Jour. Agri. Assoc. China* 72:57-66, 1930.

Li, Liang Chang, 李真慶. A contribution to the freshwater Algae of Kiangsi. *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(2):65-112, 2 pl., 2 tab., 1938.—The investigation is based on 653 collections made in 7 localities. The total number of species and varieties recorded (exclusive of Diatoms) is 212 belonging to 69 genera, 28 families and 5 classes. In the Myxophyceae there are 41 species, in the Chlorophyceae 172, 2 in Heterokontae, 1 in Chrysophyceae and 2 in Euglenineae. Seven new species and varieties are described; 42 species represent new records for China, and 197 are new records for Kiangsi. New forms are: *Oocystis eremosphaeria* var. *major*, *Oedogonium fanii*, *Spirogyra hui*, *S. lushanensis*, *Zygema kiangsiensis*, *Euastrum spicatum* var. *tenui*, and *Xanthidium aculeatum* var. *minor*.

Malloch, J. R. Exotic Muscidae (Diptera). XXVIII. *Ann. & Mag. Nat. Hist.* 4(22):322-341, 1929.—Many new species are described, including *Xenotachina armata* from Szechwan.

Marquand, C. V. B. [Descriptions of Chinese plants] in *Curtis's Bot. Mag.* 159, pts. 3, 4, 1936.—Colored drawings and descriptions in English of *Cotoneaster lactea* W. W. Smith (pl. 9454), and *Gentiana cephalantha* Fr. (pl. 9468), both from Yunnan.

E. H. WALKER

Matthew, W. D., Granger, Walter, and Simpson, George Gaylord. Additions to the fauna of the Gashato Formation of Mongolia. *Amer. Mus. Novitates* 376:1-12, 13 fig., 1929.—A list of the fossil mammals, taken from this Paleocene formation north of the eastern end of the Altai Mountains, is given. Several new forms are described. Insectivora: *Praolestes nanus*, n. gen. & sp. (Leptictidae); *Pseudictops lophiodon*, n. gen. & sp. (Inc. sed.). Glires: *Euryomysidae*, n. fam., based on *Euryomys laticeps* Matthew & Granger. Creodonta: *Opisthopsis vetus*, n. gen. & sp. (Hyaenodontidae). Amblypoda: *Prodinoceras martyr*, n. gen. & sp. (Uintatheriidae). Notoungulata: *Palaeostylops macrodon* n. sp. (Arctostylopidae).

Merrill, E. D. *Razumovia* Sprengel versus *Centranthera* R. Brown. *Bull. Torrey Club* 64: 589-598, 1937.—In this critical taxonomic treatment, eleven species and varieties of *Razumovia* (Scrophulariaceae) are recognized, extending from Japan, China and India to Australia. The genus *Centranthera* was improperly recognized in Hooker's Flora of British India and confusion has followed. Several new combinations are included in this paper as well as the new species, *R. longiflora* from Kwangtung and Indo-China.

E. H. WALKER

Merrill, E. D., and Perry, L. M. On the Indo-Chinese species of *Syzygium* Gaertner. *Jour. Arn. Arb.* 19(2) :99-116, 1938.—Fifty-one species are discussed of which 8 are described as new and 33 are new combinations. Eleven species are also from China. The authors use their recently accepted generic concept of *Syzygium* as the proper name under which to place most of the Old World species of *Eugenia*. In adopting this name "we again direct attention to the detailed structure of the fruits, temporarily neglected in taxonomic studies of this group . . ." "Most of the species with fruits (usually immature) in our Old World collections show the seed-coat adhering more or less loosely to the pericarp and the two distinct cotyledons attached chiefly near the midline of the opposing faces concealing the hypocotyl within. This is the distinguishing character of *Syzygium*, not the calyprate character of the corolla so unduly emphasized."

Miyake, T., and Koreishi, K. Morphological investigation of the weed's seed in Formosa. (In Japanese with English title.) *Formosan Agri. Rev.*, No. 377, p. 336-341, 6 pl., 1938.

Moldenke, H. N. Some needful nomenclatural changes. *Revista Sudamer. Bot.* 5 : 1-3, 1937.—Seldom do South American publications contain anything of interest to students of Asiatic botany. This paper is merely a list of critical nomenclatural changes that have arisen in the course of the author's studies at the New York Botanical Garden. There are changes in *Verbenaceae* of interest to oriental botanists, although the geographic ranges of these species are not given. The reviewer would like to call attention to his general comments on this omission of geographic data made in his review of Barkley's paper, *Langnan Sci. Jour.* 16 : 512-513, 1937. E. H. WALKER

Moore, J. Percy. Leeches (Hirudinea) from China with descriptions of new species *Proc. Acad. Nat. Sci. Phila.* 82 : 169-192, 2 pl., 1 fig., 1930.—Small collections of leeches from Szechwan, Soochow, Amoy, Manchuria, and Nanking are discussed. Eighteen species and subspecies are represented. New forms are *Glossiphonia lata multipapillata* n. ssp., *Placobdella quadrioculata*, *Dina quaternaria*, and *Haemopis gracilis*, n. ssp.

Nakai, Takenoshin. The floras of Tsusima and Quelpaert as related to those of Japan and Korea. *Proc. 3rd Pan-Pacific Sci. Congr., Tokyo* 1 :893-911, 1926 (1928).—Extensive floristic lists of woody plants from these 2 islands between Korea and Japan are presented in a study supporting the theory that Korea and Japan were continuous before the Diluvial Epoch. Tsusima, nearer to Korea than to Japan, has bamboos, *Citrus*, and *Aleurites*, groups which are Japanese and not Korean and which are unable to migrate without a land bridge. The majority of the woody plants growing on the 2 islands are common to Japan and Korea. In Quelpaert, also, there are many plants which could not have reached it without a land connection (*Prunus*, *Diospyros*, *Quercus*, *Tilia*, et al.).

BIOLOGICAL ABSTRACTS

Nakai, Takenoshin. The vegetation of Dagelet Island: its formation and floral relationship with Korea and Japan. *Proc. 3rd Pan-Pacific Sci. Congr., Tokyo* 1 :911-914, 1926 (1928).—The island, 55 miles off the east coast of Mid-Korea, is 8 sq. mi. in extent. The flora comprises 372 spp. (34 endemic) in 58 families.

BIOLOGICAL ABSTRACTS

Nakamura, S. On the jute in the middle Formosa. (In Japanese with English title.) *Formosan Agri. Rev.*, No. 377, p. 307-321, 2 fig., 1938.

Nannfeldt, J. A. Plantae sinensis a Dre. H. Smith annis 1921-2 lectae. XXI. Campanulaceae. *Acta Horti Gothoburg.* 5 :12-32, 12 pl. 1 fig., 1930.—The genera *Adenophora* Fisch. *Campanula* L., *Codonopsis* Wall., *Cyananthus* Wall., *Lobelia* L., *Platycodon* A. DC., and *Wahlenbergia* Schrad.

are treated. Taxonomic and distributional notes are given. Ten new species, 1 new form and 2 new combinations are described. Eighteen species are reported from Szechwan, 8 from Chuli, and 3 from Yunnan.

Netolitsky, F. *Bembidion gebieni* n. sp. aus China. *Koleopt. Runds* 14(4):168, 1929.

Nichols, J. T. Some Chinese fresh-water fishes. *Amer. Mus. Novitates* 402, 4 p., 2 fig., 1930; XXIV, XXV. *ibid.*, No. 431, p. 1-6, 1930; XXVI, XXVII, XXVIII. *ibid.*, No. 440, p. 1-5, 3 fig., 1930, No. 449, p. 1-3, 1931.—Two new subspecies are described, with measurements and figures. They are: *Aphyocypris chinensis shantung* and *Micropercops dabryi borealis*, both from Shantung. Two new mandarin fishes are described: *Siniperca elongata*, from Fukien, and *S. obscura*, from Kiangsi. *S. chuansti* (Basilewski) is also described. Two new species *Sarcocheilichthys*, *S. (Barbodon) parvus* and *S. kiangsiensis* are described from Kiangsi. XXVI. *Pseudogobio bicolor*, from Kiangsi, and *P. papillabrus*, from Fukien, are described and figured. XXVII. *Leiocassis (Dermocassis) analis*, n. sp., is compared with *L. tenuis* and *L. ussuriensis*. Allied catfishes of the subgenus *Dermocassis*, in China, are distinguished in a key. XXVIII. *Leiocassis* *X. tenuifurcatus* n. sp. and *Botia compressicauda* n. sp. are described from Fukien. A list is given of 34 species from Chungan Hsien.

Nierstrasz, H. F., and **Brender à Brandis, G. A.** Three new genera and five new species of parasitic Crustacea. *Proc. U. S. Nat. Mus.* 77(9):1-9, 6 fig., 1931.—*Apocepon pulcher* n. gen. & sp. is described from Tsingtau, China.

Obenberger, Jan. Buprestidae supplementa palaeoarctica. *Casopis Českosl. Společnosti Ent.* I. 25(1-2):16-21, 1 fig., 1928; II. 25(3-4):64-70, 1 fig., 1928; III. 25(5-6):121-127, 1928(1929); IV. 26(1-2):9-14, 1929; V. 26(3-4):59-63, 1929.—I. Eight species and varieties are described. *Cylindromorphus mongolicus* n. sp. is from Mongolia. II. Ten species are discussed, including *Agrilus thibetanus* n. sp. from Tibet. III. Of 7 species, *Trachys (Habroloma) Sinnica* n. sp. and *T. Jakobsoni* n. sp. are from Hong Kong, *T. Semenovi* n. sp. is from Ning Po, and *T. Jakovlevi* n. sp. from Yunnan. IV. *Trachys taiwanensis* n. sp. is from Formosa, *T. vororecula* n. sp. from Hong Kong, *T. yunnana* n. sp. and *T. aeneiceps* n. sp. from Yunnan. *Dicerca chinensis* n. sp. from China. V. *Meliboeus Potanini* n. sp. and *M. Semenoviellus* n. sp. are from Szechwan.

Osborn, Henry Fairfield. *Embolotherium*, g.n. nov., of the Ulan Gochu, Mongolia. *Amer. Mus. Novitates* No. 353:1-20, 11 fig., 1929.—Two new faunal horizons of the Oligocene were discovered in Mongolia by the American Museum Expedition in 1924-25. In one of these were found, in 1928, 3 species which are referred to the new genus *Embolotherium* of the new subfamily Embolotheriinae and which represent entirely new types of titanotheres. The new species are *E. andrewsi*, *E. grangeri*, and *E. jacksoni*. The genus is characterized by elongate premaxillaries; elevated anterior bony protuberances or nasal horns expanded at the summits; normal frontals not entering into nasal protuberances; broad postorbital expansion of vertex; zygomatica extremely broad; premolars with prominent tetartocones and partly separate metalophs; M3 with prominent hypocone. The species represent 3 different phyla which may prove to be of generic rank. Since there are no traces of embolotheres in previously described formations, "it would appear that they were from the first a separate branch of the superfamily Titanotherioidea, which developed in the plains region to the north of the Gobi Desert and finally migrated toward the end of the Lower Oligocene time as far south as the southern Gobi where we meet their remains in great abundance and where they attained surpassing size and diversity."

Osborn, Henry Fairfield. New Eurasian and American prosobranchs. *Amer. Mus. Novitates* No. 393 :1-22, 5 pl., 15 fig., 1929.—Many new species and subspecies are described and figured. *Serridentinus florescens* n. sp. is from the Pliocene of Mongolia; *Stegodon orientalis grangeri* n. sp. from the Pliocene of Szechwan.

Oshima, Masamitsu. The distribution of the cyprinoid fishes found in the Island of Formosa. *Proc. 3rd Pan-Pacific Sci. Congr.*, Tokyo 1 :1043-1044, 1926 (1928).—Abstract.

Pan, Tzu-Nung, 潘次農 Preliminary studies on vegetable poisons as insecticide. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1) :27-33, 2 fig., 1938.—Various insects were killed by being placed on leaves or flowers of *Prunus armeniaca* Linnaeus, *P. persica* Stokes and *P. davidiana* Franchet.

Parent, O. Dolichopodides nouveaux de l'extreme orient paléarctique. *Encyclop. Ent. Sér. B. Diptera* 3(2-3) :111-136, 1926.—A list of 15 new species and 1 variety, with keys, 2 species from Mongolia, 1 from Japan and the rest from China

FROM BIOLOGICAL ABSTRACTS

Pierce, A. S. Systematic anatomy of the woods of the Cupressaceae. *Trop. Woods* 49 :5-21, f. 1-16, 1937.—The 16 genera recognized in this family are: *Actirostrobos*, *Callitris*, *Tetraclinis*, *Callitropsis*, *Widdringtonia*, *Fitzroya*, *Diselma*, *Thujopsis*, *Thuja* (including *Biotia orientalis*), *Libocedrus*, *Fokienia*, *Cupressus*, *Chamaecyparis*, *Arceuthos*, *Juniperus*, and *Macrobiota*. This is a summary of examination of 84 specimens representing all but two of these genera. A key to the genera based on anatomical characters is followed by corresponding descriptions. Unfortunately no geographic data are given but some of these are eastern Asiatic genera

E. H. WALKER

Pilsbry, H. A. Manual of conchology, structural and systematic. *Couchol. Dept. Acad. Nat. Sci. : Philadelphia*, 28(109) :1-48, 8 pl., 2 fig., 1927.—This part begins the discussion of the Strobilopsidae, and includes the description of the family, a résumé of the fossil species which have been considered as members, and the (unfinished) treatment of recent species of *Strobilops*. The new section *Eostrobilops* of *Strobilops* with the type *S. hirasei* Pils., from Korea, is erected. *S. (E.) coreana* n. sp. is also described from Korea.

FROM BIOLOGICAL ABSTRACTS

Ping, Chi. A new fossil land turtle from Honan. *Bull. Geol. Soc. China* 8(3) :231-238, 2 pl., 2 fig., 1929.—*Sinohadrianus sichuanensis*, n. gen. & sp., is described from the Upper Eocene of Honan Province. The species is most closely related to *Hadrianus corsoni* (Leidy).

Ping, Chi. Zoological notes on Amoy and its vicinity. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol.* 1(8) :126-142, map, 1930.—Notes are given on the characteristics of the Amoy coast. Instructions are given on collecting. There are notes on the characteristic Porifera, Coelenterata, Echinodermata, Bryozoa, Vermes, Mollusca, Crustacea, Ascidiants, fishes, shore and water birds, and aquatic mammals.

Pleske, Th. Révision des espèces paléarctiques des familles Erinnidae et Coenomyiidae. *Encyclop. Ent. Sér. B. Diptera* 2(4) :161-184, 1926.—The characters of the order Eremochacta, relationships between the families, and keys to families, subfamilies, genera, and species are given. *Solva ussuriensis* n. sp. and *Nematoceropsis ibex* n. gen. & sp. are from Manchuria.

FROM BIOLOGICAL ABSTRACTS

Popov, V. B. New forms of the genus *Psithyrus* Lep. *Konowia* 6(4) :267-274, 2 fig., 1927.—*P. skorikovi* n. sp. is described from Kansu, China. There is a key to the palearctic species of *Psithyrus*.

Prout, A. E. Some new forms of the hyphenid genus *Simplicia*; with foreword and note on *Simplicia (Culicula) bimarginata*. *Bull. Hill Mus. [London]* 3(1):13-22, 1929.—Fourteen species and subspecies are discussed. *S. stictogramma* n. sp. is recorded from Ya-chiao-ling and Ichang, China.

Prout, A. E. Some new forms of the noctuid genus *Ericia*, with notes on three previously described species. *Bull. Hill Mus. [London]* 3(2):111-119, 1929.—Fourteen species and subspecies are described. *E. occidua* n. sp. is from Teng-yueh-Ting, W. China.

Prout, Louis B. New palaearctic Geometridae. *Novitates Zool.* [Tring] 35(2):142-149, 1929.—Seventeen new species and subspecies are described. *Ecliptoperpa mactata placata* n. subsp. is from Ningpo and *Cariye cruciplaga debrunneata* n. subsp. from W. China.

Raynal, J. Contribution à l'étude des phlebotomes de la Chine du nord. *Arch. Inst. Pasteur d'Indochine* 7(25):37-99, 30 fig., 7 pl., 1937.—This monograph of four species of *Phlebotomus* in north China is very detailed and apparently very thorough. The species treated are: *Phlebotomus chinensis* Newstead 1916, *P. sergenti* var. *mongolensis* Sinton 1928, *P. squamirostris* Newstead 1923, and *P. khawi* Raynal 1936. Following a long historical account each species is described separately by sexes and the pertinent parts figured. The key to the four species is divided into two parts, one for the females, the other for the males. Biology and geographical distribution are discussed. Seven pages of references complete the paper.

W. E. H.

Redinger, K. Restitution und kritische Revision der Flechtengattungen *Enterographia* Fee und *Sclerophyton* Eschw. *Rept. Sp. Nov. Fedde* 43: 49-77, 1938.—A critical treatment of these lichen genera, the first of which has several species in Japan.

E. II. WALKER

Rehder, Alfred. Two new Rhododendrons of the Tsutsutsi section. *Jour. Arn. Arb.* 10(3):182-184, 1929.—*R. annamense* n. sp., related to *R. hainanense* Merr., is from Annam, and *R. Simsii* Planch. var. *mesembrinum* n. var. from Yunnan.

Rock, Joseph F. Seeking the mountains of mystery. An expedition on the China-Tibet frontier to the unexplored Amnyi Machen range, one of whose peaks rivals Everest. *Nat. Geog. Mag.* 57(2):131-168, 2 maps, illus., 1930.—The author describes his adventures on an overland journey from Yunnanfu to the Amnyi Machen range. The object of the trip was the collection of specimens of birds and plants.

Samuelsson, Gunnar. Plantae sinenses a Dre. H. Smith annis 1921-22 lectae. XX. Polygonaceae. *Acta Horti Gothoburg.* 5:1-11, 2 pl., 1930.—Locality records are given on 6 species of *Rumex*, 2 of *Oxyria*, 3 of *Rheum*, 1 of *Atraphaxis*, 3 of *Koenigia*, and 30 of *Polygonum*.

Schauberger, E. Zur Kenntnis der palaearktischen Harpalinen. (Sechster Beitrag.) *Koleopterol. Rundsch.* 15(5-6):193-209, 1930.—*Acupalpus connotatus* Bates and *A. agonooides* Bates are recorded from China.

Scheerpeltz, Otto. Monographie der Gattung *Olophrum* Er. (Col. Staphylinidae). (11. Beitrag zur Kenntnis der palaearktischen Staphyliniden-fauna, gleichzeitig 1. Beitrag zur Kenntnis der nearktischen Staphylinidenfauna.). *Verhandl. Zool.-Bot. Ges. Wien* 79(1):1-257, 3 maps, 6 pl., 123 fig., 1929.—The genus is recharacterized and there are keys to species, description of each species and a discussion of the geographical distribution. *O. sinense* n. sp. is recorded from Shanghai.

Schweinfurth, Charles. Orchids collected by J. F. Rock on the Arnold Arboretum expedition to northwestern China and northeastern Tibet. *Jour. Arn. Arb.* 10(3) : 169-174, 1929.—Locality records and descriptive notes are given on 14 species. Eleven of the species are recorded from Kansu, 4 from Tibet. *Aemesia longibracteata* n. sp., allied to *Aemesia squamellosa* (Schltr.), and *Oreorchis Rockii* n. sp., allied to *O. nana* Schltr. and *O. oligantha* Schltr., are described from central Kansu.

Sealy, J. R. [Descriptions of various species] in *Curtis's Bot. Mag.* 159, pts. 3, 4, 1936; 160, pts. 1-4, 1937-38.—The following eastern Asiatic species are described and discussed in English and illustrated in color: *Succowocca humilis* Staph. (pl. 9449), Hupeh, Szechwan, and Yunnan; *Sorbus Pratti* Koehne (pl. 9460), Szechwan, Kansu, and Yunnan; *Anemone rupicola* Cambess. (pl. 9476), Himalayas from Chitral eastward to N. W. Yunnan and Szechwan; *Gypsophila Oldhamiana* Miquel (pl. 9484), Honan, Shantung, Chihli, Manchuria, Korea; *Tripterygium Wilfordii* Hook. f. (pl. 9488), Formosa, Anhwei, Chekiang through Kiangsi, Hunan, and Kweichow to Yunnan; *Camellia saluenensis* forma *macrophylla* forma nov. (pl. 9505), Yunnan.

E. H. WALKER

Séguy, E. Études sur les Anthomyiidae. 4 & 5. *Encyclop. Ent. Sér. B. Diptera* 2(4) : 193-194, 1926; 3(2-3) : 41-44, 10 fig., 1926.—*Pegomyia jynx* is described from China.

FROM BIOLOGICAL ABSTRACTS

Séguy, E. Études sur les mouches parasites et les formes voisines. II. Contribution à la connaissance des Chrysomyiini typiques. I. *Encyclop. Ent. Sér. B. Diptera* 4(3-4) : 101-116, 1 pl., 20 fig., 1928.—There is a table of the 4 genera with included species. *Cyaneosomyia phonis* n. gen. & sp. is from China.

FROM BIOLOGICAL ABSTRACTS

Seitz, Adalbert. Die Gross-Schmetterlinge der Erde. *Fauna Palaearctica Suppl.* 1 : 1-24, 3 pl., 1929.—The treatment of Papilionidae is begun by K. von Rosen, who lists species of the following genera: *Papilio*, *Teinopalpus*, *Luehdorfia*, *Armandia*, *Sericinus*, *Thais*, *Hypermnestra*, and *Doritis*, including: *Papilio mencius* ssp. *tsinlingshani* n. ssp. from Kansu, *P. hooxes nigricans* ssp. *parcesquamata* n. ssp. from China. Chr. Bollow begins his treatment of the genus *Parnassius* (*Mnemosyne*-group).

FROM BIOLOGICAL ABSTRACTS

Semenov-Tian-Shanskij, A., and Kostylev, G. Additamentum primum ad monographias Evanidiarum ab J. J. Kieffer conscriptas (Hymenoptera). *Rev. Russe d'Ent.* 22(1-2) : 85-91, 7 fig., 1928.—*Gasteruption argentifrons* n. sp. is from Chinese Turkestan.

FROM BIOLOGICAL ABSTRACTS

Semenov-Tian-Shanskij, A., and Znojko, D. Ad cognitionem Liciniorum (Coleoptera, Carabidae). *Revue Russe d'Ent [Moscow]* 23 (3-4) : 178-183, 1929.—*Martyr alter* n. sp. is described from China; *Colpostoma petri* n. sp. from Turkestan.

FROM BIOLOGICAL ABSTRACTS

Senn, Harold A. Experimental data for a revision of the genus *Lathrus*. *Amer. Jour. Bot.* 25 : 67-78, fig. 1-56, 1938.—The chromosome number and morphology of 42 species were studied along with the epidermal cell pattern and structure of calyces and styles. Attempts were made to hybridize these species in order to obtain clues to the evolutionary relationships between species. Plants were grown from seed received from various part of the world, representing most of the sections recognized in Ascherson and Graebner's *Synopsis der mitteleuropäischen Flora—Leguminosae*, found to be the most satisfactory general taxonomic treatment of the sections of this genus. There are recognized in *Index Kewensis* 281 "good" species distributed in the temperate parts of the world or higher mountains in the tropics. It is expected eventually to extend this preliminary study into a full revision. The chromosome number is the same, $n=7$, for all except one of these 42

species, the exception being *L. venosus* Muhl. with $n=14$. In chromosome structure only the section *Clymenum* is distinctive, it being also well marked morphologically. Comparative morphology of the pistils and calyces and epidermal cell patterns support Ascherson and Graebner's arrangement of the sections. Hybridization was largely unsuccessful, hence furnished no positive evidence for tracing the evolutionary history. In this paper the taxonomic history and literature of the genus is reviewed and a list of cited literature is added. It represents a modern method of approach to a taxonomic revision, a method that is certain to result in greater finality in taxonomic work whenever it can be applied.

E. H. WALKER

Shaw, Tsen-Hwang. 香振黃. Body length and body weight in the Bell Frog. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1) : 19-25, 1 fig., 1938.—The length and weight of 56 specimens from Tsingtao were recorded. The body weight was found to be near the third power of its linear dimension. Variations occur due to species, locality, and other factors. "The process of growth in *Bombina orientalis* (Boulenger) is constant. So far as the animal remains in the same environment, in or near water, its form or specific gravity is established and does not change very much during the later period of growth."

Shaw, Tsen-hwang. Notes on some fishes from Ka-Shing and Shing-Tsung, Chokiang Province. (In English with Chinese abstract.) *Bull. Fan Mem. Inst. Biol.* 1(7) : 107-124, 10 fig., 1930.—A study was made of 70 specimens of 28 species. *Pseudobagrus ondon*, *Opsariichthys chekiangensis*, *Culter kashinensis*, and *Himibarbus shingtsongensis* are new to science.

Shaw, Tsen-hwang. 香振黃. Some observations on the life history of a tide-pool copepod, *Tigriopus fulvus* (Fischer). (In English with Chinese summary) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1) : 9-17, 4 fig., 1938.—The two sexes of the copepod are distinct in the adult stage. The females seem to be more numerous than the males. Breeding takes place in both spring and summer. The copulation process takes only a few seconds. The female has a single egg sac. The usual number of eggs varies from 30 to 95, average about 66.

FROM AUTHOR'S SUMMARY

Sherff, Earl Edward. New or otherwise noteworthy Compositae. III. *Bot. Gaz.* 88(3) : 285-309, 5 pl., 1929.—Species, varieties and forms of *Ridens*, *Coreopsis* and *Cosmos* are treated taxonomically. Descriptions are given of one new section, 6 new species, 16 new varieties, 2 new combinations and 1 new form.

Silvestri, F. Descrizione di due novi generi di Coleotteri mirmecofili dell' Estremo Oriente. *Boll. Lab. Zool. Gen. e Agraria [Portici]* 19 : 261-268, 6 fig., 1926.—*Ambrosiger* (Pselaphidae), n. gen. near *Apoderiger*, type *A. gravis* n. sp., is described from China; *Eucurtiopsis* (Histeridae), n. gen. near *Eucurtia*, type *E. mirabilis* n. sp. is from Formosa.

BIOLOGICAL ABSTRACTS

Silvestri, F. Japygiade (Thysanura) dell' Estremo Oriente. *Boll. Lab. Zool. Gen. e Agraria [Portici]* 22 : 49-80, 21 fig., 1928-1929.—Among new forms described are: *Japyx japonicus* var. *primaria*, *J. costantini*, *J. poletti*, *J. girodi*, *J. soverbyi*, *Parajapyx emeryanus*, with var. *centralis*, from China; *Japyx eupellii*, *J. toci*, and *J. duporti* from Indo-China. *Parajapyx isabellae* is reported from Japan and China and is considered identical with *P. minimus* Schenk of N. Amer.

FROM BIOLOGICAL ABSTRACTS

Sleumer, H. Vermischte Diagnosen. IV. *Rept. Sp. Nov. Fedde* 41 : 117-128, 1936.—Includes *Scolopha hainanensis* n. sp. from Hainan, based on A. Henry 8151, the type, and *S. Henryi* n. sp. from Hainan based on A. Henry 8346, the type.

E. H. WALKER

Sleumer, H. Vermischte Diagnosen. V. *Rept. Sp. Nov. Fedde* 42: 257-267, 1937.—Includes *Symplocos Stewardii* n. sp. from Kwangsi.

E. H. WALKER

Smith, G. Elliot. Early man in China. *Nature [London]* 125 (3151): 448-449, 2 fig., 1930.—A review is given on the finding of *Sinanthropus* remains in China.

Spare, G. H., and Fischer, C. E. C. Plants new to Assam: I. *Kew Bull. Misc. Inform.* 1929(8): 247-254, 1929.—Of the 36 plants mentioned, 11 were previously known from China.

Spock, L. Erskine. Pliocene beds of the Iren Gobi. *Amer. Mus. Novitates* No. 394: 1-8, 6 fig., 1929.—The geological formation of the vertebrate-bearing Pliocene beds is described.

Stacey, J. W. Note on *Carex*—IX. *Leaf. West. Bot.* 2: 30-31, 1937.—*Carex macrocephala* has been said by Mackenzie to occur in eastern Asia and North America but various other authorities have disagreed. This note calls attention to the statement of the Japanese botanist, Jisaburo Ohwi, that *C. macrocephala* occurs in Hokkaido and northward and *C. Kobomugi* on the southwestern coast of that island and southward. An introduced species in New Jersey corresponds with *C. Kobomugi*. Other notes concern American species.

E. H. WALKER

Stackelberg, A. v. Species palaearcticae generis *Cynorrhina* (Dipt., Syrphidae). *Konowia* 7(3): 252-258, 1928.—Five species are described. *Cynorrhina nitens* n. var. *pallipes* is from Korea.

Sterneck, Jakob. Die Schmetterlinge der Stotznerschen Ausbeute. Geometridae, Spanner. *Deutsche Ent. Zeitschr. "Iris"* 41(1): 9-32, 7 fig., 1927.—*Pingasa alba* n. ab. *alboapicata*, *Hipparchus* (*Geometra*) *ovalis* n. sp., *Comibaena rectilineata* n. sp., *Hemistola minutula* n. sp., *H. parallelaria* n. var. *distans*, and *Comostola pupillata* n. sp. are described from western China. Supplementary descriptions of a number of previously known genera are given.

BIOLOGICAL ABSTRACTS

Stringer, Herbert. New species of Microlepidoptera in the collection of the British Museum. *Ann. & Mag. Nat. Hist.* 6(34): 415-422, 1930.—*Lamprystica igneola* is from Japan and China; many other new species are from Japan.

FROM BIOLOGICAL ABSTRACTS

Suessenguth, K. Einige bemerkungswerte Pflanzen des Münchner Staatsherbars. *Rept. Sp. Nov. Fedde* 42: 43-49, 1937.—Consists mostly of new species, varieties and forms, including *Lonicera ripicola* forma *glabra* n. form., *Meconopsis lutescens* n. sp., and *Primula tangutica* var. *minor* n. var., all from Kansu, collected by Father J. Trippner. *Pinus silvestris* var. *katakeimenos* Graebner, a dune form formerly recorded from the "Ostsee, in Danemark" in northern Russia, is now recognized from Manchuria, collected by G. Fochler-Hauke. A somewhat variant form of *Managettaea Hummelii* H. Smith is noted from Kansu.

E. H. WALKER

Summerhayes, V. S. *Eria amica* Reichenbach f. *Curtis's Bot. Mag.* 159, pl. 9453, 1936.—An orchid from northeastern India, northern Burma, northern Siam, Yunnan, and Formosa. There is a colored plate and a description in English.

E. H. WALKER

Tago, Katsuya. Notes on the habits and life history of *Megalobatrachus japonicus*. *Xe Congres Internat. Zool. Budapest*, 1927 Part 1, 828-838, 1 pl., 1929.—The author recognized only the single species from Japan and China. Observations on the distribution and habitat of the species are given together with brief accounts of food, spawning habits, the

egg mass, and development of the larva. A bibliography of 68 titles is appended.
S. C. BISHOP in BIOLOGICAL ABSTRACTS

Takahashi, Kenji. Vorläufige Mitteilungen über die Vegetation Karafutos (Sudzachalins). Ein Beitrag zur Kenntnis der Ostasiatischen Baumgrenze. *Bot. Jahrb. Engler* 68: 269-344, 2 pl., 1937.—An ecological description of the vegetation with lists of components of various formations follows a rather detailed analysis of the climatic, soil and biologic factors. The alpine tree line is considered natural but influenced by many complicated factors. A bibliography of 200 references is added. E. H. WALKER

Takahashi, R. Notes on some Formosan Aphididae. II. *Trans. Nat. Hist. Soc. Formosa* 19(102):247-259, 14 fig., 1929.—Ten species are listed with host, habitat, and taxonomic notes. The following are new: *Capitophorus formosanus*, *Trichoregma* based on *Oregma bambusifoliae* Takah., *Myzocallis viridis*, *M. pilosus*.

Talbot, G. A monograph of the pierine genus *Delias*. Pt. 1, p. 1-56, 1 fig., 1928; Pt. 2, p. 57-115, 6 pl., 1929; Pt. 3, p. 117-172, 4 pl., 1929. John Bale Sons & Danielsson, Ltd., London. Pr. 7/6 per pt.—The monograph is based especially on a study of the extensive collection of *Delias* at the Hill Mus., dissections having been made at the Museum of all known species except in the case of a few unique specimens. The scent scales were studied by Francis Ball and important taxonomic use is made of these structures. Wing venation is figured. The genus occurs in central and southern China, Tibet, Formosa, Hainan, through India westward to the Solomons and Australia. Separate keys are given to ♂♂ and ♀♀, total number of known forms being somewhat over 400. There is also given a classified list of *Delias*, and a list arranged according to geographic distribution, habits, migration, mimicry, morphology (especially of the scent scales), internal structure, genitalia, origin, and phylogeny. A bibliography and a list of synonyms complete the introductory material to the taxonomic treatment. In the latter, each species is described, and in many cases is to be figured; the genitalia and scent scales in most cases are described and figured.

BIOLOGICAL ABSTRACTS

Talbot, G. Seven new forms of *Delias* (Lep. Pieridae). *Bull. Hill Mus. London* 2(3):224-228, 1928.—Of the forms described *D. belladonna kwantungensis* [sic] is from Canton.

Teilhard de Chardin, P. How and where to search for the oldest man in China. *Bull. Geol. Soc. China (Peking)* 5(3-4):201-206, 1927.—The most favorable place in which to find artifacts is in basal gravels of calcareous nodules, washed out from earlier loessic beds. Pleistocene formations of the San-Men or Sangkan-ho series may contain records of "Chellean" man. The best places to find his traces are thought to be those basal gravels of the gray loess in which the hard parts of a destroyed reddish loess have been accumulated.

Teilhard de Chardin, P., and Young, C. C. On some traces of vertebrate life in the Jurassic and Triassic beds of Shansi and Shensi. *Bull. Geol. Soc. China* 8(2):131-133, 1 pl., 1 fig., 1929.—The track of an herbivorous ornithopod Dinosaurian from the Jurassic of Shensi and the bone of an Amphibian from the Triassic of Shansi are described.

Ts'en, Mong-Kang, 謝茂康, Chu, En-Lung, 朱恩慶 and Liang, Pe-Hsien, 梁伯先. Measurements of ionization in the ionospheric layers during the partial solar eclipse of June 19, 1936 at Shanghai. *Sci. Papers Nat. Res. Inst. Physics Acad. Sinica* 2(2):169-178, 4 fig., 2 tab., 1937.—This is a brief report of the measurements by the method of critical penetration frequency of the maximum intensities of ionization in the

ionospheric layers during the partial solar eclipse of June 19, 1936, at Shanghai. The results support the ultra-violet light theory of ionization in the F₁ layer. For the E layer these results suggest that a considerable part of the ionization may be due to agents different from ultra-violet light.

AUTHORS' ABSTRACT

Vassiljev, V. N. The vegetation cover of the Little Khingan. (In Russian with English summary.) *Trans. Far Eastern Br. Acad. Sci. USSR* Tom II, p. 103-272, 16 fig., 45 tab., 1937.—The paper is devoted to the description of the vegetation of the northwestern part of the Manchurian floristic region, known as Little Khingan, from the geobotanical point of view. The principal plant formations could be grouped as: 1, cedar forests with broad-leaved trees; 2, cedar forests with dark conifers; 3, forests of dark conifers—spruces and firs; 4, larch forests. Little Khingan forms the limit of three floristic regions. The crests of the mountain ranges are covered with spruce and fir forests of the Okhotsk type, the more or less swampy river valleys, and the terraces,—with forests, consisting of the Dahurian larch, characteristic of the East-Siberian floristic region. The best habitats (hills, middle parts of the mountain slopes, flood plains of rivers) are occupied by cedar forests. Besides the above mentioned vertical zonality, the region is equally characterized by a well-marked horizontal zonality. Thus, proceeding in northern or northwestern direction, it will be observed that the cedar forests decrease, while spruces and firs occur in greater numbers. As one advances towards the north, the stands of the latter trees descend into lower zones, while larches, besides their habitats in the plain, begin to occupy the slopes. The economic importance of the different forest formations is discussed.

FROM AUTHOR'S SUMMARY

Walker, Bryant. The molluscan hosts of *Clonorchis sinensis* (Cobbold) in Japan, China and southeastern Asia, and other species of molluscs closely related to them. *Amer. Jour. Hyg. Monogr.* 8:208-294, 1 pl., 9 fig., 1927.—The first intermediate host of *C. sinensis* is the widespread mollusk, *Bithynia striatula* Benson. A monographic account is given of the East Asian species of the subfamily Bithyniinae (family Amnicolidae). A supplement is given on certain related mollusks which have been found infected or are under suspicion. The genera treated are: *Ficcarulus* Neumann (3 sp.), *Paraficcarulus* Annandale (5 sp., including *P. woodi* n. sp. from the Yangtze River), *Pseudovivipara Annandale* (1 sp.), *Hydrobioides* Nevill (2 sp., including *H. dautzenbergi* n. sp. from W. Laos), *Bithunia* Leach (16 sp., including *B. funiculata* n. sp. from Laos and *B. thatkeana* n. sp. from Tonkin.)

Wang, Mme D. T., 王宗清. Study on the nuclear type and karyokinesis in *Xanthoceros sorbifolia* Bge. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Bot.)* 8(2):57-64, 1 pl., 1938.—The nuclear structure of *X. sorbifolia* is described. It is of the euchromocenter type and has the following characteristics: 1, The interphase nucleus is homogeneous in structure; 2, the euchromocenters are rounded in shape and lie free at the periphery of the nucleus; 3, the number of euchromocenters is definite and equal to the number of chromosomes; 4, each euchromocenter gives rise to one chromosome by transformation. There are 24 chromosomes

FROM AUTHOR'S SUMMARY

Ward, F. Kingdon. The distribution of *Primulas* from the Himalaya to China, with descriptions of some new species. *Ann Botany* 44(173):111-125, map, 1930.—The relationship between the floras of the region from Sikkim to Yunnan is discussed, based on the distribution of the various species of *Primula*. The effects of intervening mountains and glaciation are discussed. Six new species and 3 new varieties of *Primula* are described.

Ward, F. Kingdon. *Rhododendron palulum* and its allies. *Gard. Chron. [London]* 88(2285) :298-299, 1930.—*R. uniflorum*, *R. imperator*, *R. pemakoense* Ward, and *R. palulum* Ward are discussed as ornamentals. The last two are redescribed.

Ward, F. Kingdon. Two Tibetan rhododendrons. *Gard. Chron. [London]* 87(2261) :330, 1930.—*R. hirtipes* Tagg and *R. cerasinum* Tagg are described.

Weidenreich, Franz. The face of Peking woman. *Nat. Hist.* 41(5) :358-360, 5 fig., 1938.—Figures show the reconstruction of the head of a female of *Sinanthropus pekinensis*, made by adapting the size of the single parts derived from several individuals. The recent finding of a large fragment of an upper jaw makes possible reconstruction of the face with a fair accuracy. The position of Peking man in the human family tree is diagrammed and the skull is compared with that of a gorilla and with a north Chinese adult.

Werner, F. Über einige Mantiden aus China (Expedition Stotzner) und andere neue oder seltene Mantiden des Museums für Tierkunde in Dresden (Orth.). *Stettiner Ent. Zeitung* 90(1) :74-78, 1929.—*Tenodera aridifolia* Stoll, *T. stotzneri* n. sp., *Hierodula bipapilla* Serv. and *H. chinensis* n. sp. are described from Peking.

West, R. J. Descriptions of new species of Japanese, Formosan and Philippine Geometridae. *Novitates Zool. [Tring]* 35(3) :254-264, 1930.—*Idaea jordani* n. sp. is from Formosa.

Wheeler, William Morton. A few ants from China and Formosa. *Amer. Mus. Novitates* No. 259, 4 p., 1927.—*Leptothorax congius* var. *eburneipes*, *Leptothorax galeatus*, *Tapinoma geei* var. *tinctum*, and *Polyergus samurai* ssp. *mandarin*, all new to science, are described from specimens taken in the vicinity of Peking. *Camponotus punctatissimus* ssp. *formosensis* n. ssp. is from Formosa. Several old species are also mentioned.

Wheeler, William Morton. Some ants from China and Manchuria. *Amer. Mus. Novitates*, No. 361 :1-11, 1929.—Identifications are given for a collection of ants belonging to the Ponerinae, Myrmicinae, Dolichoderinae and Formicinae. New forms are: *Pheidole tsailuni*, n. n. for *P. concinna* Wheeler; *P. javana* var. *desucta* from Back Liang; *P. nodus* var. *piaeveyxta*, from Japan; *Crematogaster (Acrocoelia) brunnea* ssp. *contenta* var. *contemtor* from Soochow; *C. (A.) b.* ssp. *ruginota* var. *chungi*, from Foochow; *C. (A.) b.* ssp. *r.* var. *lefeuvrei*, from Shantung; *Leptothorax congius* var. *wui*, from Peking; *Camponotus japonicus* var. *miltotus* from Peking; *C. j.* ssp. *wui*, from Soo-how; *Formica (Coptoformica) exsecta* ssp. *manchu*, from Peking; *F. (Proformica) lefeuvrei* from Shantung.

Wilkinson, D. S. New species and host records of Ichneumonidae and Braconidae. *Bull. Ent. Res. London* 21(2) :147-158, 4 fig., 1930.—Among species described is *Apanteles chinensis* n. sp. from Foochow.

Yang, We-I. 楊惟義. On the abdominal segments of urostyliids. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 7 (6) :199-209, 2 fig., 1938.—After a careful study the author agrees with Jeannel that the abdominal segments of urostyliids, like other hemipterous insects, number 11 in each sex, with the addition of a telson.

Yang, We-I. 楊惟義. Eleven new species of Urostyliidae. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1) :49-82, 9 pl., 12 text fig., 1938.—All species are described and figured. The only Chinese species is *Urochela neoluteovaria*, from Foochow. Other species are from India, Burma, and Siam.

Yang, We-I, 楊惟義. A new method for the classification of urostyloid insects. (In English with Chinese summary.) *Bull. Fan Mem. Inst. Biol. (Zool.)* 8(1):35-48, 12 fig., 1938.—The external structure of the terminal abdominal segments is used as a basis for differentiation. The segments of 12 known species are described and figured.

Zimin, L. Kurze Uebersicht der palaearktischen Arten der Gattung *Servillia* R.-D. (Diptera). II. *Revue Russe d'Ent.* 23(3-4):210-224, 16 fig., 1929.—A key is given to the species of *Servillia*, including *S. basalis* n. sp. from China.

FROM BIOLOGICAL ABSTRACTS

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LIFE HISTORY STUDIES IN NINE FAMILIES OF KWANGTUNG BUTTERFLIES (LEPIDOPTERA: RHOPALOCERA)¹

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(Concluded from *Lingnan Science Journal*, Vol. 17, No. 3, p. 424.)

10. **Papilio sarpedon** Linnaeus, 1758 (pl. 15, fig. 3, 4; pl. 20, fig. 5)
Papilio sarpedon Linn., Syst. Nat. ed. x, 1758, p. 461.

The eggs of *Papilio sarpedon* were collected on young leaves and shoots of *Cinnamomum pedunculatum* (Thunb.) Nees. from the end of April to the first ten days of May, and during the second and third weeks of June. Young caterpillars were obtained at the end of April, on the first ten days of May, throughout the month of June, and in the first week of October. Mature caterpillars were secured at the end of April. The food plants are *Cinnamomum pedunculatum*, *Desmos cochinchinensis* Lour., *Michelia champaca* Linn., and *Magnolia coco* (Lour.) DC. The incubation period is more than five days; the duration of the first stadium is 3 days, the second stadium an average of 1.5 days, the third stadium 2 to 3 days, the fourth stadium 2 to 3 days, and the last stadium 4 to 7 days. The duration of the overwintering pupal stage is 154 days, and that of the summer generation about 10 days. Adults appear at the end of March, from the last week of May to the first week of June, and from the middle of June to the second week of July. During spring and early summer, the development from egg to adult required a month.

Specimens of this butterfly were collected in Hainan Island as follows: Naam Fung, July 6, 1932 and San-ts'u'en-kai-hui, July 4-8, and Nan-po-ts'uen, Sept. 1-3, 1935. Hong Kong Island, May 21, 1934; in Hwang-mei, Hupeh Province, Aug. 25-29, 1933.

The smooth and spherical eggs are deposited singly on young shoots and on both surfaces of young leaves. The egg is dull whitish

¹Contribution from the Lingnan Natural History Survey and Museum, Lingnan University, Canton, China.

when newly laid and darkens shortly before hatching. It is 1 to 1.26 mm. in diameter. The first instar caterpillar is 3 mm. long and 0.765 mm. across the head. The head is dark brown and the body is pale yellowish-brown, with a pale band in the middle of the body. Three pairs of dark subdorsal thoracic spines and one pair of whitish caudal spines are present. The venter and legs are pale. The second instar caterpillar is 5 to 6 mm. long, and 1.225 mm. across the head. The head is pale and the body is dark greenish, with smoky-black thorax. The thoracic spines are dark with metallic blue tinge while the caudal spines are still whitish. A pale whitish narrow lateral band is present above the prolegs. The venter and legs are pale green. The general color of the third instar caterpillar (from 7 to 12 mm. long; width across head, 1.89 mm.) is dark green. The caudal pair of spines is pale, with black on the side near the tip. In other respects the larva resembles that of the previous instar. The fourth instar caterpillar is 14.5 to 17 mm. long and the width of the head is 2.7 mm. It is green and fat, with a yellowish band connecting the bases of the metathoracic subdorsal spines. Some very faint yellowish markings are present especially on the sides of the body. The apical half of each caudal spine is dark. Other characters are similar to those of the previous instar. The last instar caterpillars are from 22 to 33 mm. in length and 3.69 mm. across the head. The metathoracic spines are yellowish with a black band on the basal half. A thin black line is present at its extreme base. Both the band and the line are replaced on the inside of the spines by the yellowish band which joins the two spines. The caudal spines are black on their apical half on the inside, and for the entire length on the outside.

The palish green chrysalid is 30 mm. long, 10 mm. wide, and 8 mm. high. The anterior end is truncate; thorax with a conical horn, which is blunt at tip; abdomen somewhat cylindrical, reduced greatly posteriorly to the square posterior extremity. From the thoracic horn extend four yellowish ridges. The medio-dorsal ridge or line runs anteriorly to the square head, and posteriorly to the metathorax where it branches into two subdorsal lines, extending to the posterior tip of the chrysalid. The lateral pair runs ventrad and caudad, passing just above the developing wings and continuing as the subventral lines to the caudal end. A pair of thinner lateral ridges originates at the base of the horn, extending downward and slightly caudad but not reaching the antennae. The chrysalid is fastened to its support by its posterior tip and by a silken girth around the thorax, and the head is thus held upward.

The wing expanse is from 55 to 68 mm. UPPERSIDE: Male and female: the general color is dark, nearly black, with light greenish markings. A broad medial band, which is semi-hyaline and broadest in the middle, extends from interspace 2 on the hind wing to near the apex of the fore wing. Part of the band which crosses inter-

spaces 6, 7 and 8 on the hind wing is whitish; a submarginal series of slender lunules is found in interspaces 3, 4, 5, and 6. The antennae, head, thorax, and abdomen are black. **UNDERSIDE:** The general color is brownish-black. The markings, pale green tinged with pale blue, are similar to those on the upperside. A short subbasal band extending from the costal margin to the subcostal vein, and a postdiscal area between the medial band and the submarginal lunules, up to vein 6, are marked with crimson. Near the anal angle a crimson spot is present, below which a yellowish spot occurs. The labial palpi, head, thorax, and abdomen are largely gray.

11. **Papilio xuthus** Linnaeus, 1767 (pl. 15, fig. 5, 6)

Papilio xuthus Linn., Syst. Nat. ed. 1767, p. 751.

A full-grown caterpillar was collected on Australian lemon, on Nov. 2. From Nov. 6, the pupal stage requires 196 days, and on May 22 the adult emerged.

Adults were collected in the following places: Swatow, Kwangtung Province, June 7-9, 1934; Shui Tang, Yunnan Province, South China, August 28-29, 1934.

The general color of a mature caterpillar is green. A yellowish band, maculated with black brown lines, and ending with two eye-like structures, is found on the metathorax. The yellow stripes are found on the body, and a white band is found just above the prolegs.

The butterfly is 70 mm. across the fore wings. **UPPERSIDE:** Female: the ground color is black with the markings largely cream-colored. **Fore Wing:** the cream-colored markings are as follows: four broken discoidal streaks (extending from the base to slightly more than half the length of the cell); followed by a slender transverse bar; a comparatively wider marking along the discocellulars. A slender streak largely occupies the middle part of interspace 1a. A broad streak, occupying interspace 1, is angulated downward below the origin of vein 2, and its apical portion is double. A discal series of subtriangular and elongated markings is found in interspaces 2, 3, 4, 5, 6, and 7; each one of the last two is generally divided by an oval black medial spot into two. Another spot is situated at the base of interspace 8. A complete submarginal series of lunules is present. **Hind Wing:** the cell is almost completely occupied by a very broad cream-colored streak; a very conspicuous color marking, which is found at the base of each interspace, extends to the discal area. In short, the basal half of the wing is cream-colored and is transversed by black veins. A post-discal series of diffused blue spots is found from interspaces 1-6. A distinct submarginal series of lunular cream-colored markings is present. The spot at the anal angle is orange-colored with a black center. The terminal cream-colored lunular markings may be seen in interspaces 4, 5, 6, and 7. The antennae, head, thorax, and abdomen are laterally striated with cream-color. **UNDERSIDE:** The ground color is similar

to that of the upperside; the markings are more conspicuous. In addition, deep yellow or orange-colored markings are found near the postdiscal area of interspaces 3 and 4, and on much of the submarginal and terminal areas between vein 4 and 8. The labial palpi, thorax and abdomen are largely cream-colored.

VII. PIERIDAE

1. **Catopsilia pyranthe** (Linnaeus), 1758 (pl. 15, fig. 7, 8, 9)
Catopsilia pyranthe Linn. (*Papilio*), Syst. Nat. ed. x, 1758, p. 469.

The eggs of this species were collected on May 21 and June 10, while both young and mature caterpillars were secured at the end of October, in the third week of May, and on the first ten days of June. The last stadium requires four days and the pupal stage requires from 5 to 12 days. Adults emerged in the middle of November, at the end of May, and in the second week of June. The food plant is *Cassia fistula* L.

Adults were collected as follows: White Cloud Mountain, Canton, March 21, 1923; Swatow, September 10 and 11, 1934; Nanning, Kwangsi Province, South China, August 2-3, 1934.

The eggs are spindle-shaped, whitish, and smooth, 1.5 mm. long and 0.43 mm. wide. They are laid on both surfaces of *Cassia fistula* L. leaves. The body of the newly hatched caterpillar, about 2 mm. long, is light brownish. The general color of the head of young caterpillars varies from very pale whitish-green to light brownish, possessing short pointed and brownish tubercles. The body is very pale green, though sometimes it is greenish, and densely dotted with short and dark brownish projections on the dorsal and subdorsal areas. There is a dark lateral line, formed by the same colored projections but larger and compactly arranged. The lateral area is sparsely spotted with smaller brownish colored projections. The venter and legs are pale. The medium-sized caterpillars are similar to the mature caterpillars, which may be described as follows: length 21 to 27 mm., characterized by having the hairs on the conspicuous and highly chitinized tubercles, which are found on the head and on the body, especially abundant on the dorsum. The head is comparatively larger and the posterior end is gradually pointed. The body segments are annulated; the tubercles of the lateral line are highly developed and tinged with metallic blue. Minute tubercles are found on the subventral area. The legs and venter are pale; the thoracic legs are rather short.

The greenish crysalid is spindle-shaped, 15 mm. long, 7 mm. wide, and 7.5 mm. thick. It is characterized by having the anterior end produced into a cephalic cone, and gradually tapering toward the posterior extremity, which is truncate. The thorax is dorsally humped near the middle, and the body is ventrally swollen especially

near the region of the first and second abdominal segments. The lateral line appears to be yellowish.

The wing expanse of the butterflies is 43 to 62 mm. **UPPERSIDE:** Male and female: the general color is chalky-white, slightly tinged with pale greenish. *Fore Wing*: the costal margin and the outer margin are bordered with brownish-black, wide toward the apex. A conspicuous discocellular black spot is present. *Hind Wing*: immaculated, but sometimes the very narrow terminal black spots are found at the apices of the veins. The antennae are brownish-black, and the head is brownish. The thorax and abdomen are whitish, the former covered with long bluish hairs. The eyes are black. **UNDERSIDE:** The ground color is similar to that of the upperside, but the anterior half of the fore wing and all of the hind wing are suffused with pale ochraceous on which numerous ochraceous striae are found. An indistinct discal reddish spot is found on both wings. The labial palpi, head, thorax, and abdomen are white. The male is similar to the female, except that the brownish-black terminal border of the fore wing is inwardly pointed at the veins; there is an anterior postdiscal short black band which unites with the brownish-black terminal border at the apex and outer margin. On the hind wing, a rather conspicuous terminal marking is present.

2. *Delias aglaia* (Linnaeus), 1758 (pl. 15, fig. 10; pl. 16, fig. 1, 2; pl. 20, fig. 6, 7)

Delias aglaia Linn. (*Papilio*), Syst. Nat. ed. x, i. 1758, p. 465.

The mature caterpillars were collected on Hung Mui (紅梅), on April 20, 1937. Pupation took place on April 22. The duration of the pupal stage was 8 days.

Butterflies are in the collection from the following localities: Honam Island, Canton, May 21, 1934, the winter of the same year, and February 28, 1935; Loh Fau Shan, August 10, 1933; Ting-Wu Shan, Kao-yao Dist., April 6-7, 1934; Ting-wu, November 11, 1934; Wui-tung, Chung-Shan Dist., March 9-12, 1934. All of the above localities are on the mainland of Kwangtung Province. Adults were collected in Hainan Island as follows: Lam-ting-ts'uen (10 mile NE. of Sam-ah-kong), Yai District, February 14-16, 1935; Kom-yan city and vicinity, Kan-on Dist., March 9, 1935.

A full-grown caterpillar is 30 mm. long, 4 mm. wide, and 4 mm. thick. The general color of the body is reddish-brown with a bright yellow transverse line situated in the middle of each segment. The head, cephalic portion of the prothorax, dorsum of the posterior end of the body, thoracic legs, and also the outer portions of prolegs are dark. The body and head possess very long, slender, and rather soft hairs. On the body the above-mentioned long hairs found from mesothorax to eighth abdominal segment are sparsely situated on the subdorsal, lateral, and subspiracular areas. The body and head also bear numerous minute hairs.

The chrysalid is reddish-brown with cream-colored spots and is 26 mm. long, 5.15 mm. wide, and 6 mm. thick. As viewed dorsally, the head is produced into a short and blunt cephalic projection and two small subdorsal projections which are located on the posterior portion of the vertex. A pair of mesothoracic lateral projections, one on each side, is also present. A carinate medio-dorsal ridge is present; it is strongly developed and, being the highest at the middle of mesothorax, it forms a prominent projection. Acute projections are found on the mediodorsal ridge of certain abdominal segments, and on the side of the anterior abdominal segments. Those found on the lateral area of abdominal segments 2, 3, and 4 are very conspicuous. Small tubercles are also found on the subdorsal area of mesothorax and on certain anterior abdominal segments. The chrysalid tapers toward the posterior end which is truncate at its tip.

The butterflies are from 69 mm. to 73 mm. across the fore wings. **UPPERSIDE:** Male: the ground color is dark brownish-black. *Fore Wing*: three-fourths of the cell and interspaces 1 and 2 are more or less distinctively marked with whitish. A conspicuous oval spot is situated at the lower apex of the cell. A submarginal series of whitish markings, which are pointed inward, is present. Those found in interspaces 6 and 8 are rather elongated and are shifted a little inward. *Hind Wing*: there is a broad subbasal transverse whitish band which becomes posteriorly a very distinct bright yellow patch which occupies most of the interspaces 1a, 1, and 2. A white, somewhat elongated, spot is found along the middle discocellular. A much curved postdiscal series of whitish spots, which are pointed inward, is found in interspaces 3-7. The antennae, head, and thorax are covered with bluish-gray hairs. **UNDERSIDE:** The ground color is similar to that on the upperside, but is slightly lighter. The markings of the fore wing differ from those on the upperside by having the markings in interspaces 1, 2, 3, and in the cell forming a distinct oblique broad whitish band across the fore wing. The markings of the hind wing are also similar to those in the male. The basal crimson patch of the underside shows through the transparent wing; the subbasal transverse band is ill-defined, and somewhat yellowish.

3. **Hebomoia glaucippe** (Linnaeus), 1758 (pl. 16, fig. 3, 4; pl. 20, fig. 8, 9)

Hebomoia glaucippe Linn. (*Papilio*), Syst. Nat. ed. x, 1758, p. 469.

The caterpillars feed on the leaves of *Crataera religiosa* Forst. Eggs were collected during the first 28 days of November. Caterpillars were found in November and during the first part of December. From 42 to 47 days are required for the completion of the larval stage, 44 days on the average. They are found hibernating in the pupal stage during the latter part of December, January, February and the first part of March. Adults appeared during the latter part of March and during the first ten days of April.

We have specimens collected in Hainan I. at Lai-mo-ling, Ting-an District, May 22, and Nam-liu-tin, Lam-wan-tung (Loi Territory), K'ung-shan District, July 29-30 and August 12, 1935, by F. K. To. Another locality is mts. 5 mi. S. of Lungchow, Lung-chou District, Kwangsi, August 8, 1934, Ernest R. Tinkham.

The eggs are spindle-shaped; they are 2.1 mm. in length and 1.1 mm. in diameter as indicated by measurements made from alcoholic material. The eggs were cream-colored when found, later changed to somewhat pinkish, but a day or two before hatching they were darker. The upper end is somewhat pointed, while the other end is flat and glued to the surface of the leaf. There are about 10 longitudinal furrows.

The newly hatched caterpillars, 3.5-5 mm. long, are pale, dull, and brownish-green. Both the setae of the head and body are whitish and very conspicuous. The second instar caterpillars, 7-10 mm. long, are largely greenish-brown, while the anterior portions of the bodies are enlarged at their tips. The third instar caterpillars are from 11 to 17 mm. in length; the head possesses dense short and pointed setae, while the body setae are not very distinct. On the annulated body minute hairs are present. The fourth instar caterpillars vary from 15 to 28 mm. in length. The general color is green or olivaceous except the head, which is pale. On the lateral area of the mesothorax there is a blue eye-like structure, while on the metathorax the eye-like structure is pale orange in color. Toward the end of this stage, there is a whitish granulated structure on the subspiracular area of each annulet forming a row. On the mesothorax and metathorax these granulated structures are more conspicuous. The fifth instar caterpillars are from 32 to 40 mm. in length; they differ from the previous instar caterpillars in having the row of whitish granulated structures found on the subspiracular area more conspicuous, and the meso- and metathorax are comparatively wider. The sixth instar caterpillars are 50-60 mm. long. Their general color is green. The blue eye-like structure of the mesothorax, the reddish eye-like structures of the metathorax, and the granulated, yellowish (with reddish tinge) structures are very conspicuous on the lateral area of the abdomen. The meso- and metathorax are ventrally and laterally swollen, causing the head to appear very small. Each annulet possesses a row of dark minute hairs; those found on the thorax are more conspicuous.

The green chrysalid is 35 mm. in length, 10 mm. in greatest width, and 12 mm. in depth. The chrysalid is spindle-shaped. The anterior end projects into a single median cephalic horn which is curved upward. The ventral line of the body forms a prominent obtuse angle at a point slightly nearer the cephalic than the caudal end.

The butterflies are from 70 to 95 mm. across the fore wings.
UPPERSIDE: Female: the ground color is creamy white with a slight

greenish tinge. *Fore Wing*: the costal margin is narrow, brownish and with the basal portion of a bluish tinge. An irregular black area extends obliquely from about the middle of the costa (covering the apical area) to near vein 1. Inside this black triangular area, there is a rich orange-red patch which is traversed by black veins, and a series of four submarginal orange-red spots located in interspaces 3 to 6. *Hind Wing*: the outer margin is blackish with a triangular area bordered inwardly from veins 2 to 7. A postdiscal series of large triangular black spots is found in interspaces 2-7. The head, prothorax and patagia, except the tips, are pale brownish. Antennae are dark brown with the tips pale; eyes brownish-red; mesothorax and abdomen grayish-blue. *UNDERSIDE*: The apical area of the fore wing, as well as the whole of the hind wing, mottled with brown striae. Thorax and legs pale brownish; abdomen white with a slight grayish-blue tinge.

4. *Pieris canidia* (Sparrman), 1768 (pl. 16, fig. 5, 6, 7; pl. 20, fig. 10, 11)

Pieris canidia, Sparrman (*Papilio*), Amaen. Acad. vii, 1768, p. 504.

The caterpillars of various sizes were collected in the months of October, November, December and April. Eggs were collected about the middle of November and April. The food plants of the caterpillars are *Brassica oleracea* Linn. var. *capitata* Linn., *B. oleracea* var. *botrytis* Linn., *B. napus* Linn., and 菜珠菜.

The larval stage requires about three weeks to complete its development; there are six instars. The duration of the pupal stage varies from 1 to 3 weeks. Adults emerged in November and December.

Collecting localities are as follows: Lung T'au Shan, September 29, 1923; Hoh Kai Hon, Ling District, July 6-7, 1934; Swatow, August 5, 1934—all in Kwangtung Province, South China. Yunnan Province: Pit Shit Chai (near Mengtsz), August 19, 1934; Pine Mountain, August 28-29, 1934; An Ming Djou Hot Spring, September 4, 1934.

The yellowish eggs are deposited singly, and they are spindle-shaped. The upper end is somewhat pointed, the other end is flat and glued to the surface of the leaf. It is 0.99 mm. in length and 0.56 mm. in diameter. There are about 13 longitudinal ridges.

The newly hatched caterpillar is 2 mm. long, while the mature caterpillar is 32 mm. long, 4 mm. wide, and 4 mm. high. The measurements of the heads of various instars are as follows: first, 0.34 mm. wide; second, not recorded; third, 0.6 mm.; fourth, 1.05; fifth, 1.44; and sixth, 2.15 mm. wide. The young caterpillars are pale green, and the mature caterpillars can be described as follows: general color vivid green, with a greenish-yellow median line. The large hairs of both head and body are found on conspicuous tubercles

which are largely brown so that the body is maculated with numerous dark spots. The annulets of the body are not very prominent.

The chrysalid is 18 mm. long, 5 mm. wide, and 5 mm. thick. The general color varies from green to brownish-gray. The general form of the pupa is similar to that of *Delias aglaia* (Linn.), but differs from it chiefly by having a long cephalic projection. The lateral projections of the mesothorax are nearly absent. The lateral spines found on abdominal segment 3 are extremely distinct. As viewed above numerous punctures are noticeable. The dark markings are densely deposited.

The butterflies are from 43 mm. to 54 mm. across the fore wings. **UPPERSIDE:** Male: the ground color is pale cream-color with black markings. *Fore Wing*: the base of the wing and the basal half of the costa are irrorated with dark scales; the apex and the outer margin to about vein 2 are black, on the outer margin the black markings extend for a very short distance, and become triangular along the veins. *Hind Wing*: the base of the wing is also irrorated with dark scales; a big dark marking is found about interspaces 6 and 7; a terminal series of somewhat subtriangular markings is situated on veins 2 to 6. The antennae, head, thorax and abdomen are largely dark; minute white markings are found on the antennae; grayish-black hairs occur on the head and thorax. **UNDERSIDE:** *Fore Wing*: the ground color is whitish. The cell and the costal margin are also irrorated with black scales. The apex is more or less tinged with ochraceous-yellow. Conspicuous black markings are found in interspaces 1 and 3. *Hind Wing*: the ground color is somewhat ochraceous-yellow and irrorated with dark scales. The costal margin above vein 8 is bright orange-yellow. The labial palpi, head, thorax, and abdomen are whitish; and the labial palpi are fringed with dark hairs. The abdomen is slightly tinged with ochraceous-yellow. The female differs from the male by having the markings more prominent, and in having two conspicuous spots in interspaces 1 and 3 (the one in interspace 1 may extend to the interspace 1a).

5. **Terias hecate** (Linnaeus), 1758 (pl. 16, fig. 8, 9, 10; pl. 20 fig. 12, 13)

Terias hecate (pl. 16, fig. 106), Linn. (*Papilio*), Syst. Nat. ed. x, 1758, p. 470.

The young caterpillars were collected on the last ten days of September, at the beginning of October and about the middle of November. Both medium and mature caterpillars were obtained about the same time that the young caterpillars were found and also in the second week of May. From September 26 to October 14 a 4 mm. long caterpillar requires 28 days to develop into an adult. From the end of September to the beginning of October the average duration of the pupal stage is 6 days; from the third week of October to the first week of November the pupal stage lasts 17 days; in the

middle of May the pupal stage requires only about 5 days. Adults emerged in the latter half of September, at the beginning of October, throughout November, and about the middle of May. The food plants are *Aeschynomene indica* L., *Crotoxylon polyanthum* Korth and *Pithecellobium dulce* (Roph.) Benth.

Butterflies were collected in South China, Kwangtung Province, on Lung T'au Shan, K'u-h-Kian District, September 15 and 17, 1923; at Lung Ping Hui, Lien District, May 16-17, 1934; and on Honam Island, P'an-yu District, Canton, August 29, 1923. They were also obtained from Yunnan Province, South China, from Copper Temple, Yunnan-fu, August 27, 1924; at Tia Feng Ou, Yunnanfu, August 25, 1934; and at An Ning Djou Hot Springs, September 4, 1934. On Hainan Island, this butterfly was collected at Loh-fung-tung, Yai District, February 17-18, 1935, and at Sam-ah-kong, January 24-26, 1935.

The young caterpillars are greenish. The head and body bear numerous small hairs. The annulets of the body are visible and a pale yellowish line is present. A full-grown caterpillar is 28 mm. long, 3 mm. wide, and 3 mm. thick. The general color is green with lateral line whitish. The annulets of the body are very conspicuous. The hairs and tubercles are found on the head and the body. The tubercles on the body and on most of the head are capitate; those on the body are arranged in transverse rows. The venter and legs are pale.

The greenish chrysalid, with a dark longitudinal line, is 19 mm. in length, 4 mm. in width, and 6 mm. in thickness. As viewed dorsally, the cephalic end is produced into a pointed conical structure; the mesothorax is slightly dorsally humped, and the body is gradually tapered toward the posterior end with its tip truncate. Certain specimens possess a pair of dark spots which are situated on the subdorsal area of abdominal segment 3. The ventral line is much curved in the region of the first three abdominal segments.

The wing expanse of the butterflies is from 32 to 46 mm. **UPPER-SIDE:** Male and female: the ground color is yellow, or may vary from light yellow to bright lemon yellow. The markings are black. *Fore Wing:* apex and outer margin are bordered with black, this border continuing along the costal margin to the base of wing, near which it may be more or less diffused. The inner margin of the black border from the costal margin to vein 4 is oblique and extends irregularly inward. The area between veins 2 and 4 excavates inwardly, and is inwardly pointed at vein 3. The area below vein 2, including the anal area, appears to be a square spot with its inner margin somewhat irregular. *Hind Wing:* a terminal black band with its inner margin broadly serrate, and the area near the inner margin pale. The antennae are grayish; the head, thorax and abdomen are largely yellowish, and densely shaded with bluish-smoky scales.

UNDERSIDE: The ground color is light yellow; the markings are reddish-brown. *Fore Wing*: two slender transverse lines are found in the basal half of the cell, and a reniform spot is situated on the discocellulars. There is a curved subbasal series of three spots, followed by a discal marking and an irregular slender spot; there is a postdiscal series of irregular markings. On both wings the veins, which reach the costal margin and the outer margin, end with minute reddish-brown spots. The labial palpi, head, thorax, and abdomen are whitish-yellow. The dry season form differs chiefly from the above-mentioned form by having the markings on the underside well-defined and more prominent. In addition, on the fore wing there is a preapical, transverse, elongated, and short bar, which extends downward from the costal margin to vein 4.

VIII. LYCAENIDAE

1. *Chilades laius* (Cramer), 1780, 1782 (pl. 17, fig. 1, 2, 3)

Chilades laius (pl. 19, fig. 135), Cramer (*Papilio*), Pap. Exot. iv., 1780, p. 62, pl. 319, fig. DE.

Caterpillars of this species were collected in the middle of May and June. The food plants are *Atlantia buxifolia* (Benth.) Oliv., and *Citrus limonia* Osbeck. The last stadium is 3 days, and the pupal stage lasts from 5 to 7 days. Adults emerged in the last week of May and June.

The general color of the caterpillars is greenish. The body is dorsally and ventrally compressed. The head is small, pale-black, shining, and retractile. The intersegmental incisions are not very prominent. The body bears numerous short brownish hairs, those found on the thorax are more conspicuous. Legs are small, and pale greenish; the thoracic legs are weakly developed. The last instar caterpillar measures from 8 mm. to 10.5 mm. in length.

The pale greenish chrysalid is 6.5 mm. long, 3 mm. wide, and 2.8 mm. thick. The chrysalid is blunt at both ends, widest at about the second and third abdominal segments, and slightly humped on the dorsum of the mesothorax and on the middle portion of the abdomen. A girdle is found on the area between the metathorax and first abdominal segment. Usually some brownish markings, especially on the dorsum, are also present. The ventral line is practically straight.

The butterflies are 18 mm. to 24 mm. when the wings are spread. **UPPERSIDE:** Male: the ground color varies from bluish-purple to brownish. *Fore Wing*: the costal margin and outer margin are edged by a very slender dark brownish-black line. The cilia are brown at bases and white at tips. *Hind Wing*: the costal margin is more or less dusted with black. A very slender black terminal line is present. The cilia are also brown at base, and white outwardly. Usually a submarginal series of black spots is found from interspaces

1 to 6. The inner margin is broadly pale. The antennae, head, thorax, and abdomen are dark; the former is more or less fringed with white, while the head, thorax, and the base of abdomen are more or less covered with dark bluish hairs. **UNDERSIDE:** The ground color is gray and marked with very dark brown. **Fore Wing:** the markings are as follows: a transverse lunule on the discocellulars; a postdiscal series of spots which are margined with white, the first four found in interspaces 1 to 4 are elongated, and the last two are rather round and shifted inward. There is a submarginal series of spots. These are also margined with white, form a more or less continuous line, and occupy interspaces 1 to 6. A terminal fine black line is present. The cilia are brown at base and white at tips, which are also transversed medially with brown. **Hind Wing:** there is a subbasal series of 4 black spots; a slender lunular marking situated on the discocellulars. There is a postdiscal series of 8 spots, those in interspaces 3, 4, and 5 shifted outward. A submarginal lunular line is followed by a series of more or less subtriangular spots which extend from the anal angle to vein 8. Finally, a terminal black line is present. The cilia are similar to those described for the hind wing. The labial palpi are black and fringed with white and black scales. The head, thorax, and abdomen are white. The female differs from the male in having both the fore and hind wings, from their bases outward to a varying extent—not reaching the costal margin, outer margin, and inner margin—shaded with bright iridescent blue. On the hind wing there is a subterminal series of black spots which are margined with white.

2. **Deudorix eryx** (Linnaeus), 1771 (pl. 17, fig. 4, 5, 6)

Three caterpillars and 2 pupae were found inside the flower-buds of *Gardenia jasminoides* Ellis, on April 13 and July 14. The duration of the pupal stage is from 6 to 8 days. Adults emerged at the end of April and the beginning of May.

Butterflies were also collected from Honam Island, Canton, August 15 and September 6, 1923; White Cloud Mountain, Canton, March 26, 1923; Hong Kong Island, May 21, 1934.

The wing expanse of the butterflies is 26 to 39 mm. **UPPERSIDE:** Male: the ground color is smoky-black, tinged with greenish, shaded with indigo-blue which seldom reaches the costa, outer margin, or inner margin. Near the inner margin it is broadly pale. The anal angle is lobated, and is grassy-green, marked with black. The tail is dark with its tip whitish. The antennae, head, thorax, and abdomen are also smoky-black, with the tips of the antennae brownish. The cilia of both wings are smoky-black at bases and white at tips especially on the hind wing. **UNDERSIDE:** The ground color is grass-green. The inner margin of the fore wing is broadly pale. A postdiscal wavy line extends across the inner margin of hind wing to near the costal margin of the fore wing; it is especially

conspicuous on the hind wing. Usually there are two submarginal black spots which are situated in interspaces 1 and 2. The anal lobe and tail are largely black, the latter is white at tip. The cilia are grass-green at bases and white at tips. The labial palpi, thorax, and abdomen are yellowish. The female is similar to the male, but differs from it in having pale markings near the anal angle on the upperside, and white markings on the underside; the metallic indigo-blue shading is absent.

3. **Polyommatus boeticus** (Linnaeus), 1767 (pl. 17, fig. 7, 8, 9)

Polyommatus boeticus Linn. (*Papilio*), Syst. Nat. ed. xii, i, 1767, p. 739.

The mature caterpillars were collected at the end of September, October and in the third week of January. The food plants are *Crotalaria retusa* L and *C.* spp. From October 1 to 8, the duration of pupal stage is 7 days. Adults emerged from the first ten days of October to about the middle of November.

Kwangtung specimens were collected in Swatow, September 11, 1934, and Honam Island, Canton, September 8, 1936. Specimens were also found at Tia Feng On (grassy hill 3 mi. N. of Yunnanfu), August 25, 1934, and at Pi Shit Chai (near Mengtsz) alt. 4500-5000 ft., September 6, 1934, in Yunnan Province.

The full-grown caterpillars are from 10 to 14 mm. long. The 14 mm. long one is 4 mm. wide, and 3.5 mm. thick. The body is pale green with the medio-dorsal line darker. The general shape of this caterpillar is similar to that described for *Chilades laius* (Cramer).

The chrysalid measures 10 mm. long, 4 mm. wide and 4 mm. high. It is also similar to the chrysalid of *C. laius* in shape. The ground color is very pale yellowish-gray. The whole chrysalid is densely spotted with darker color—somewhat pale gray—especially on the dorsum and the lateral areas.

The butterflies measure from 25 to 35 mm. across the fore wings. **UPPERSIDE:** Male: the general color is purplish-blue with a frosted appearance on account of the presence of the scale-like hairs. *Fore Wing*: the costal margin is narrowly edged and the outer margin is comparatively broader margined with dark brown. *Hind Wing*: the costa, and outer and inner margins are also edged with dark brown, broader at the apex. Interspaces 1 and 2 each has a subterminal black spot which is surrounded by an indistinct bluish ring with a shade of pale purplish. The tail is black with its tip white. Cilia of both wings are brownish at bases and whitish at the tips. The antennae (ringed with white), thorax, and abdomen are dark with the thorax and anterior portion of the abdomen covered with bluish hairs. **UNDERSIDE:** The ground color is pale brownish-ochraceous. Both fore and hind wings are transversely marked with irregular white wavy bands or lines. The submarginal black spots found in interspaces 1 and 2 are superimposed with metallic bluish-

green scales at the outer margin. The areas inside of these spots are of bright orange. The labial palpi, head, thorax, and abdomen are whitish. The female differs from the male by having the ground color brown. In some specimens, a shade of iridescent blue—not reaching the costal margin—is found near the basal half of the wing. There is a subterminal series of somewhat violaceous-ringed spots, the posterior two of which are black, conspicuous, and usually present. Sometimes the postdiscal pale fascia is also present.

4. **Rapala varuna** Horsfield, 1829 (pl. 17, fig. 10; pl. 18, fig. 1, 2; pl. 20, fig. 14)

Deudorix varuna Horsf. (Th. V.) Cat. Lep. E. I. C. p. 91. n. 24, 1829.

The caterpillars of various sizes were collected on blossoms of *Gordonis axillaris* Don., during the second ten days of December. Young caterpillars measuring from 2 mm. to 5 mm. in length require from 70 to 75 days to complete their development. In the months of December, January and February the chrysalid stage lasts from 28 to 47 days, while during the months of February and March it requires only about 29 days. Adults appeared in February and the first half of March.

A butterfly was collected on Lung T'au Shan, K'uh-kiang Dist., Kwangtung Province, South China, on September 20, 1923.

The general color of a caterpillar 14 mm. long is dull reddish-orange. The head is small, slightly less than one-fourth of the widest part of the body. Its anterior part is black and somewhat shining while the mouth parts are pale; it is retractile. The body, dorsally and ventrally compressed, is covered with numerous short hairs which are either colorless or the same color as the body. The subdorsal and lateral protuberances of the body are well-developed. The segmental incisions are visible. The venter is somewhat pale; the legs pale amber. The prolegs are very small and are close to each other.

The brownish chrysalid is 12 mm. long, 6 mm. wide, and 5.5 mm. thick. It is slightly rough and possesses five pairs of subdorsal dark spots on the abdomen. The anterior pair in the case of certain specimens is not very conspicuous.

The butterflies are 26 to 31 mm. when the wings are spread. **UPPERSIDE:** Male: the ground color is blackish-gray. Most parts of the hind wing, as well as a patch on the fore wing, are metallic indigo-blue. The tails are dark, nearly black, with their tips pale. The antennae, head, thorax, and abdomen are also blackish-gray; the antennae are fringed with white. **UNDERSIDE:** The ground color is earthen gray. **Fore Wing:** the feeble markings are as follows: a small transverse stripe at the discocellulars and a somewhat straight postdiscal stripe. **Hind Wing:** there is a transverse stripe at the end of the cell and an irregularly curved postdiscal stripe. The

anal lobe is black. A submarginal dark spot which is shaded inwardly with orange is found in interspace 2. The labial palpi are whitish with their terminal segments grayish. The thorax and abdomen are earthen gray. Female: the female differs from the male by the absence of the conspicuous metallic indigo-blue shading, but a rather dull bluish reflection is present.

IX. ·HESPERIIDAE

1. **Erionota thrax** (Linnaeus), 1767 (pl. 18, fig. 3, 4)

Casyapa thrax Linn. (*Pap. T.*) Syst. Nat. I. 2, p. 794, n. 260, 1767.

The eggs of *Erionota thrax* were obtained in early October and in the middle of June. Caterpillars of various sizes were collected in October, in the middle of January and during the first half of June. The food plant is *Musa paradisiaca* L. The pupal stage of the overwintering generation requires 118 days, but those pupated in June required from 8 to 10 days to develop into the adult. Adults emerged at the beginning of March and about the end of June.

An adult of this species of skipper was also collected from Honam Island, Canton, China, May 31, 1933.

A description of the different stages appeared in *Ling. Sci. Jour.* 14(4) ·642-643.

2. **Parnara guttatus** (Bremer and Grey) 1853 (pl. 18, fig. 5, 6)

Pamphila guttatus Brem. Grey. (*Eud. G.*) Schmett. N. China's, p. 10, n. 43, 1853. ? (E.).

Mature larvae, 35 mm. long, 4.5 mm. wide, and 2.5 mm. across head were taken on rice on Oct. 14. They were delicate green with a darker (perhaps internal) median line, and a pale line on the latero-dorsal area. Head dull brownish-green with an oblique red brown stripe on each side. This latter bordered on the outside by a cream colored line. There were four large white blotches on underside near caudal end. Pupation occurred on Oct. 17. The chrysalid was a beautiful medium green, 39 mm. in length, sharp at the anterior and tapered at the posterior end. There were five longitudinal lines as follows: a median dark green one, a pair of pale latero-dorsal ones, and a pair of intermediate color between these and the median line. Emergence occurred between Oct. 25 and 29.

Adults were collected in Kwangtung Province as follows: Lung T'au Shan, September 15, 17, 1923; Loh Fau Shan, alt. 3800-4000 ft., August 4, 1933, and alt. 2000 ft., October 15, 1934. Adults were also collected in Kwangsi Province, in Nanning, Yih-ning District, August 2-3, 1924, and in Kwei Hsien, Kwei District, July 28-29, 1934. In Hainan Island the species was taken at Sam-ah-kong, Yai District, February 6, 1935.

3. **Suastus gremius** (Fabricius), 1798 (pl. 18, fig. 7, 8; pl. 20, fig. 15, 16)

Hesperiella gremius Fabr. (*Hesp. G.*) Ent. Syst. Suppl., p. 433, 1798.

The caterpillars of different instars were collected during the first part of December and at the end of February. The food plant is *Phoenix canariensis* Chaub. From December to April, the fourth stadium requires from 30 to 36 days, the last stadium 36-51 days, and pupal stage lasts from 31 to 43 days. In the months of January, February, and March, the duration of the fifth stadium and pupal stage is about the same as above, but in March and April the pupal stage lasts for a shorter period (from 18 to 23 days). A caterpillar 10 mm. long requires 113 days to complete its development. Adults emerged in March and April.

The caterpillar is characterized by having the heart-shaped head attached to a strongly constricted "collar". The body is cylindrical, widest near the proleg-bearing segments and slightly tapered toward each end. The annulets of the body are indistinct because the intersegmental incisions are rather shallow or obscure. The young caterpillar is reddish-brown while the full-grown caterpillar is greenish, with a darker medio-dorsal line which is very conspicuous. The supraanal plate is bordered with white. The spiracles are black. The ground color of the head is pinkish-white; conspicuous black bands are found on the subdorsal, caudal, lateral, and subventral area of each side of the epicranium. Very minute hairs are found on the head and body. One specimen of the last instar caterpillar is 4.5 mm. wide, 4.5 mm. high, and 26 mm. long.

The chrysalid, yellowish-white dusted with white powder, is 23.5 mm. long, 4.8 mm. wide, and 5 mm. high. The cephalic end is broadly round, and the caudal end is tapered almost to a point. As viewed dorsally, the mesothorax is slightly humped; the mesothoracic spiracles resemble a pair of plate-like structures, which seem to form an external closing apparatus. Numerous medium-sized hairs are found all over the body. Ventrally, the maxillae extend slightly beyond the caudal margin of the wing. The antennae reach three-fourths of the length of the wing. The prothoracic legs are about half the length of the wing; and the mesothoracic legs are about two-thirds of the same.

The butterflies measure from 30 mm. to 35 mm. when the wings are spread. **UPPERSIDE:** Female: the ground color is brown with greenish tinge. The basal portion of the fore wing is irrorated, more or less, with yellowish-brown scales; yellowish-brown hairs are found on the greater part of the hind wing. The cream-colored hyaline markings found on the fore wing are as follows: three conspicuous spots in interspaces 1, 2, and 3, arranged in an oblique median line; one or two spots situated near the apex of the cell; interspaces 6 and 7 each has a small spot near the base and sometimes

one is also present in interspace 8. Cilia of both wings are rather brownish at bases and whitish at tips. The antennae, head, thorax and abdomen are dark brown; the tips of the antennae are reddish while specks also occur on the antennae. The head and thorax are covered with greenish-brown hairs. **UNDERSIDE:** The ground color is brown, the hind wing, and the costa and apical area of the fore wing are high irrorated with yellowish scales. The markings on the fore wing are similar to those on the upperside except that the one in interspace 1 is diffused. Usually a dark spot is found near the cell end, and a curved series of postdiscal spots is present. The labial palpi are whitish and mixed with black hairs. The thorax and abdomen are largely yellowish-gray.

廣東九科蝶類生活史之研究

賀輔民 吳玉洲 曾慶雲 合著

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(摘要)

鱗翅目昆虫，除少數幼虫為益虫外，餘皆為害虫，舉凡與經濟有關係之植物，莫不皆受其害焉。本所對於此類昆虫，研究有年，近僅將研究所得，提綱摘要，草成斯文，以便作海內研究蝶類者之參考途徑也。本文論及廣東蝶類四十種，分隸下列九科：斑蝶，眼蝶，籃蝶，蛱蝶，燕蛱蝶。鳳蝶，粉蝶，小灰蝶，及弄蝶。所述各種，對其成蟲與未成長各期，均有描述。此四十種蝶類，及其少數之蛹與幼虫，皆可見於圖焉。

Explanation of Plates

Plate 15

- Fig. 1. *Papilio protenor* Cramer, 1775 or 1779, ventral side ♂.
2. *P. protenor* Cramer, 1775 or 1779, dorsal side ♀.
3. *P. sarpedon* Linn., 1758, dorsal side ♂.
4. *P. sarpedon* Linn., 1758, ventral side ♂.
5. *P. xuthus* Linn., 1767, dorsal side ♂.
6. *P. xuthus* Linn., 1767, ventral side ♂.
7. *Catopsilia pyranthe* (Linn.), 1758, dorsal side ♂.
8. *C. pyranthe* (Linn.), 1758, ventral side ♂.
9. *C. pyranthe* (Linn.), 1758, dorsal side ♀.
10. *Delias aglaia* (Linn.), 1758, dorsal side ♂.

Plate 16

- Fig. 1 *Delias aglaia* (Linn.), 1758, ventral side ♂.
2. *D. aglaia* (Linn.), 1758, dorsal side ♀.
3. *Hebomoia glaucippe* (Linn.), 1758, dorsal side ♀.
4. *H. glaucippe* (Linn.), 1758, ventral side ♀.
5. *Pieris canidia* (Sparrman), 1758, dorsal side ♂.
6. *P. canidia* (Sparrman), 1758, dorsal side ♀.
7. *P. canidia* (Sparrman), 1758, ventral side ♀.
8. *Terias hecate* (Linn.), 1758, dorsal side ♂.
9. *T. hecate* (Linn.), 1758, ventral side ♂.
10. *T. hecate* (Linn.), 1758, dorsal side ♀.

Plate 17

- Fig. 1. *Chilades laius* (Cramer), 1780 or 1782, dorsal side ♂.
 2. *C. laius* (Cramer), 1780 or 1782, ventral side ♂.
 3. *C. laius* (Cramer), 1780 or 1782, dorsal side ♀.
 4. *Deudorix eryx* (Linn.), 1771, dorsal side ♂.
 5. *D. eryx* (Linn.), 1771, ventral side ♂.
 6. *D. eryx* (Linn.), 1771, dorsal side ♀.
 7. *Polyommatus boeticus* (Linn.), 1767, dorsal side ♂.
 8. *P. boeticus* (Linn.), 1767, ventral side ♂.
 9. *P. boeticus* (Linn.), 1767, dorsal side ♀.
 10. *Rapala varuna* Horsf., 1829, dorsal side ♂.

Plate 18

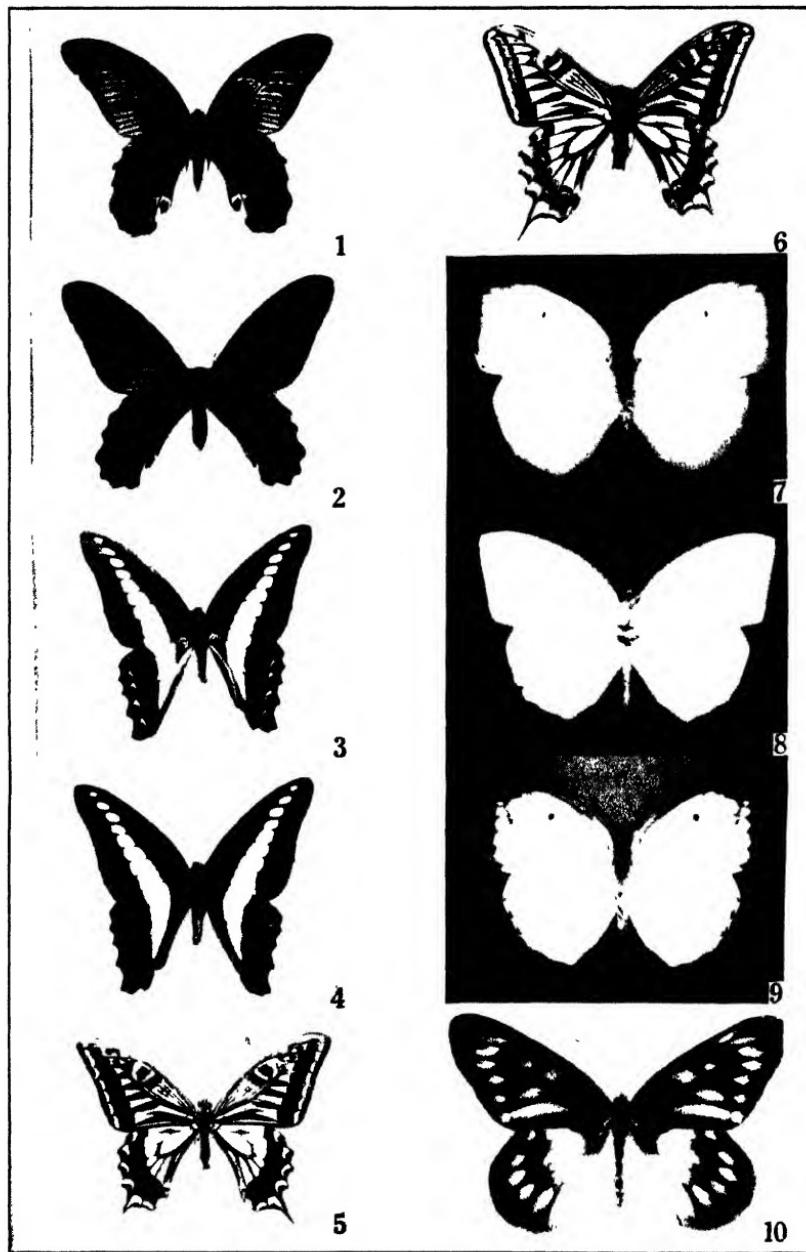
- Fig. 1. *Rapala varuna* Horsf., 1829, ventral side ♂.
 2. *R. varuna* Horsf., 1829, dorsal side ♀.
 3. *Erionota thrax* (Linn.), 1767, dorsal side ♂.
 4. *E. thrax* (Linn.), 1767, ventral side ♂.
 5. *Parnara guttata* Bremer and Grey, 1853, dorsal side ♀.
 6. *P. guttata* Bremer and Grey, 1853, ventral side ♀.
 7. *Suastus gremius* (Fabr.), 1798, dorsal side ♂.
 8. *S. gremius* (Fabr.), 1798, ventral side ♂.

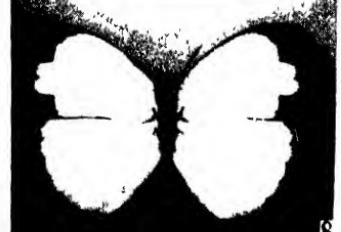
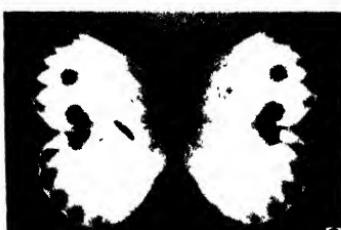
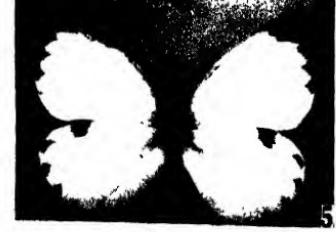
Plate 19

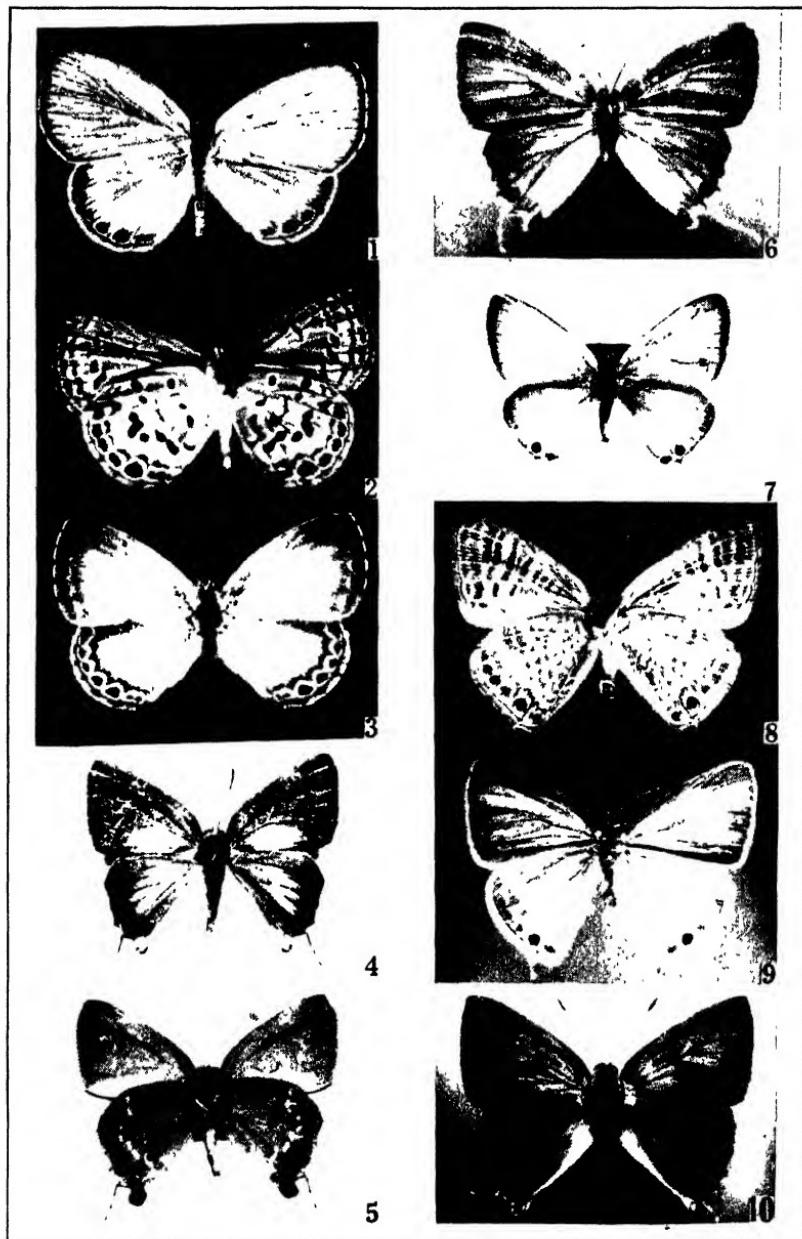
- Fig. 1. *Eupolea amymone* Godt., 1819, caterpillar.
 2. *E. midamus* (Linn.), 1764, caterpillar.
 3. *Ergolis ariadne* (Joh.), 1764, caterpillar.
 4. *Clerome eumeus* (Drury), 1773, caterpillar.
 5. *Argynnis hyperbius* (Joh.), 1764, chrysalid.
 6. *Atella phalantha* (Drury), 1770 or 1773, caterpillar.
 7. *A. phalantha* (Drury), 1770 or 1773, chrysalid.
 8. *Junonia hirta* (Fabr.), 1798, caterpillar.
 9. *J. hirta* (Fabr.), 1798, chrysalid.
 10. *Pantoporia opalina* (Kollar) ?, 1844 or 1848, caterpillar.
 11. *P. opalina* (Kollar) ?, 1844 or 1848, chrysalid.
 12. *P. perius* (Linn.), 1758, caterpillar.
 13. *P. perius* (Linn.), 1758, chrysalid.
 14. *Vanessa canace* (Jon.), 1763, caterpillar.
 15. *V. canace* (Jon.), 1763, chrysalid.
 16. *Papilio agamemnon* Linn., 1758, caterpillar.

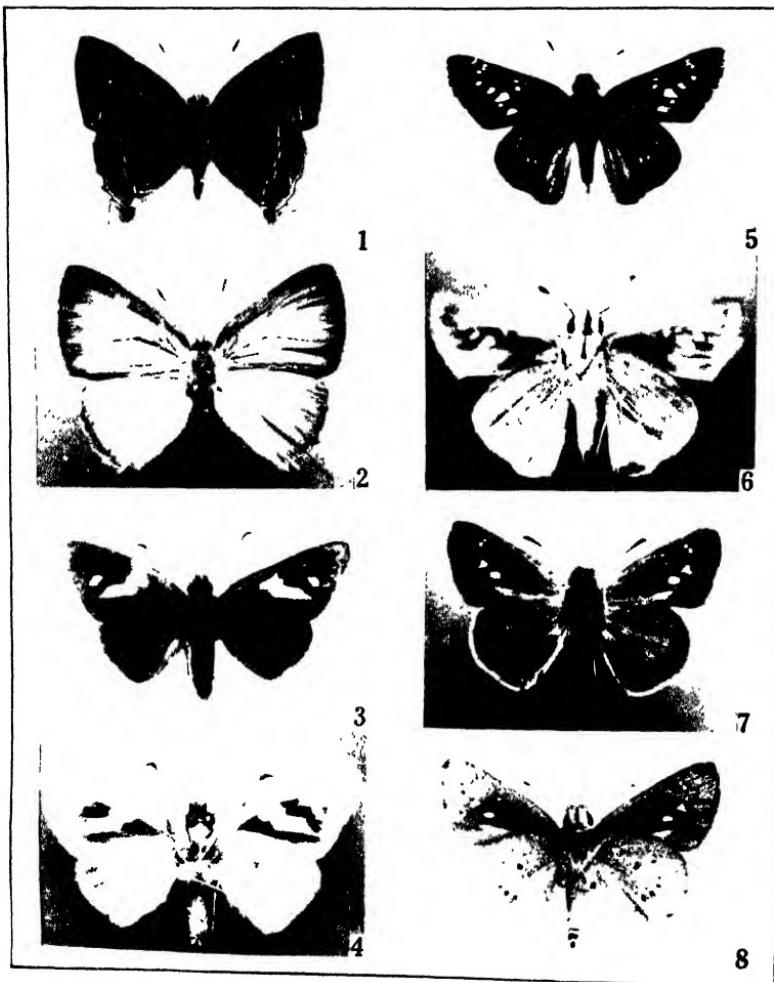
Plate 20

- Fig. 1. *Papilio clytia* Linn., 1758, caterpillar.
 2. *P. clytia* Linn., 1758, chrysalid.
 3. *P. demoleus* Linn., 1758, caterpillar.
 4. *P. polytes* Linn., 1758, caterpillar.
 5. *P. sarpedon* Linn., 1758, caterpillar.
 6. *Delias aglaia* (Linn.), 1758, caterpillar.
 7. *D. aglaia* (Linn.), 1758, chrysalid.
 8. *Hebomoia glaucippe* (Linn.), 1758, caterpillar.
 9. *H. glaucippe* (Linn.), 1758, chrysalid.
 10. *Pieris canidia* (Sparrman), 1768, caterpillar.
 11. *P. canidia* (Sparrman), 1768, chrysalid.
 12. *Terias hecate* (Linn.), 1758, caterpillar.
 13. *T. hecate* (Linn.), 1758, chrysalid.
 14. *Rapala varuna* Horsf., 1829, caterpillar.
 15. *Suastus gremius* (Fabr.), 1798, caterpillar.
 16. *S. gremius* (Fabr.), 1798, chrysalid.











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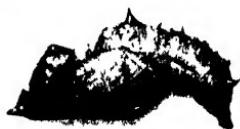
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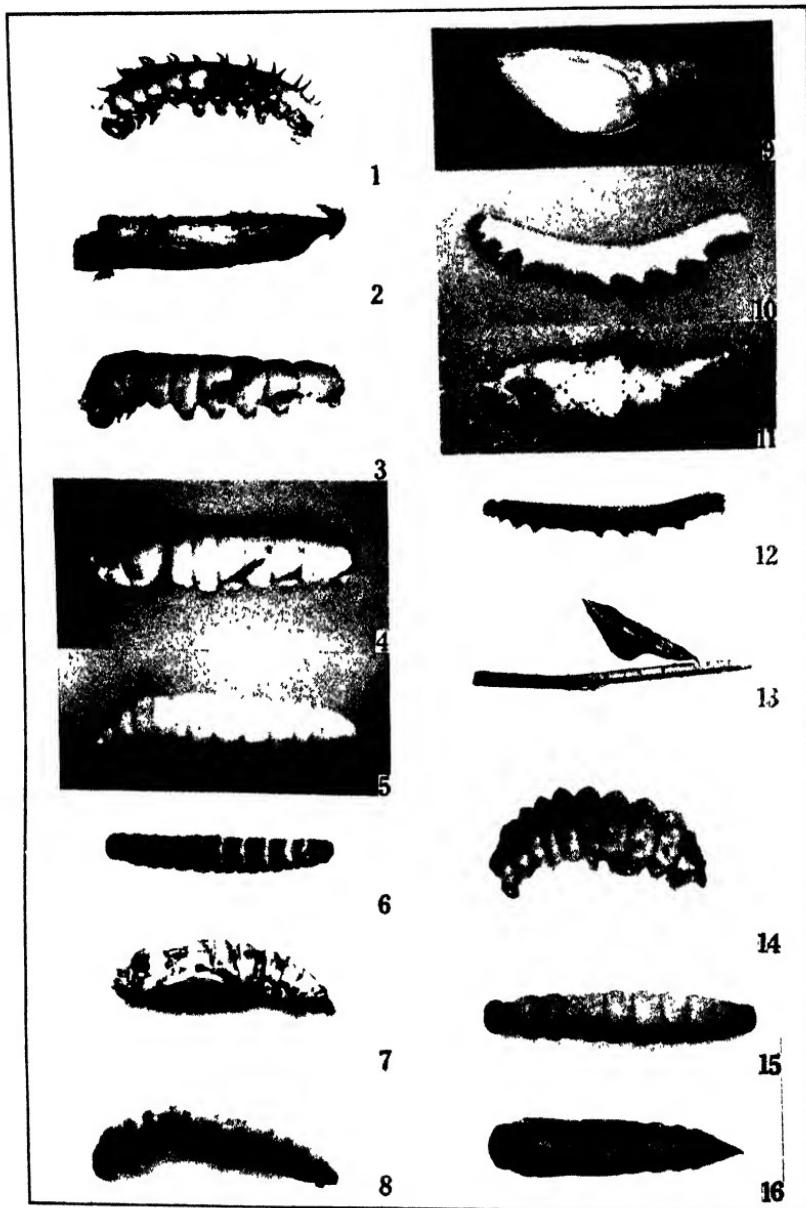
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16



NOTES ON HETERODERA MARIONI AS ROOT PARASITES IN SOME KWANGTUNG ECONOMIC PLANTS AND WEEDS¹

By

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The rootknot disease in plants, caused by parasitic nematodes, was first recorded from Kwangtung by Tu(1932) from tomato plants. Li (1935) reported the occurrence of *Tylenchulus semipenetrans* Cobb from the roots of *Citrus* nursery plants from several localities near Canton. Aside from these works, we have been unable to find any other publication dealing with parasitic plant nematodes and the diseases they cause in this province. The present paper aims to put into record, some of our observations made during the period of 1933-1937, on *Heterodera marioni* (Greer) as a root parasite of some Kwangtung economic plants as well as weeds.

The rootknot disease caused by *H. marioni* appears to be very common among a number of important vegetables and some weeds growing in and around the gardens in Canton. In all cases, the diseased specimens collected from the field were brought to the laboratory, where the roots were dissected under a binocular microscope to locate the presence of the parasites.

In general, plants infected with the parasite appeared more or less stunted, often dwarfed. Wilting of the diseased plants during hot and dry days was also noticed. Abnormal swellings or galls on the root system were typical of all infected plants. The sizes and shapes of these abnormal growths varied. Both young and old plants were infected; young infected plants often died prematurely, while older infected plants might continue to live, but were very much affected in their products both in quantity and quality.

Mature female parasites, when freshly dissected out from the host tissues, appeared white in color and flask-shaped. Measurements of 50 adults gave an average size of 850μ by 620μ . The body structures agreed very well with the descriptions given by Goodey (1933). An average taken from measurements of 50 eggs gave the size of 95μ by 41μ , oval to elliptical in shape. Measurements of 8 male worms gave the average size of $1,250\mu$ by 343μ . Detailed body

¹Thanks are due to Dr. H. T. Chen for reading the manuscript.

structures fit in with the descriptions given by Goodey. These male worms were, however, rather rare. Often they were not found in the infected tissues.

The larvae, when freshly recovered from the infected tissues, were very active. They were very sensitive to desiccation. In complete dryness, the larvae were readily killed within 10 to 15 minutes at room temperature in the summer but were more resistant to flooding in water. In the summer of 1936, two hundred larvae, newly collected from the diseased tissues, were kept in tap water in a Petri dish. Microscopic examination of the dish containing the larvae was made once every day. About half of the larvae were found dead on the twenty-fifth day. The death of the last larva occurred on the thirty-third day. Based on the data obtained from the above-mentioned simple experiment, it was believed by the authors that if more extensive experiments were carried out under the Kwangtung field conditions for determining the longevity of the larvae in water, with a view to controlling the disease by rotation of vegetable crops with rice crop, some interesting as well as helpful information would result. As most varieties of rice take more than 35 days before they can be harvested in this province, the rotation of vegetable crops with rice would give the infected area a certain period of flooding which might help to check the disease by influencing the activities of the larvae. Unfortunately, owing to heavy teaching loads, we have not been able to carry out such experiments up to the present.

In the year 1935, nine cultivated varieties of *Cucurbita maxima* Duchesne and 32 cultivated varieties of *Lycopersicum esculentum* Mill were planted in the college experimental plots for observation. Of the nine varieties of *Cucurbita maxima* observed, "Kentucky Field" or "Sweet Cheese," "Sugar" or "New England Pie," "Early White Scallop," and "Warren Turban" showed a 100 per cent infection each; "Early Yellow Scallop," "Italian Marrow," and "Table Queen" were less infected, while "Golden Delicious" and "Banana" died before the time of root examination, and hence, no data were available. For each of the above-mentioned Squash varieties, only five plants were examined. The data obtained from studying the 32 cultivated tomato varieties are presented in the following table.

As is shown in the table, all varieties of tomatoes cultivated in the college gardens have a 100 per cent infection with *H. marioni* with the exception of the following: "Chalk's Early Jewel," "Yellow Plum," "Yellow Pear," and "Red Pear." The variety "Red Pear" seemed to be the most resistant one to *H. marioni* so far introduced to Kwangtung.

TABLE 1

Field observations on the varietal susceptibility of tomatoes cultivated in the experimental plots at Lingnan University, 1935

VARIETAL NAME	TOTAL NO. PLANTS EXAMINED	PERCENTAGE OF INFECTION
1. Chalk's Early Jewel	10	90
2. Oxheart	10	100
3. Yellow Plum	10	80
4. Red Cherry	10	100
5. Break O' Day	18	100
6. Dwarf Champion	10	100
7. Gulf State Maker	6	100
8. Yellow Pear	10	90
9. Red Pear	10	50
10. Yellow Cherry	10	100
11. Red Currant	8	100
12. Living Golden Ball	10	100
13. Yellow Peach	10	100
14. Livingston Magnus	10	100
15. Kondine Red	8	100
16. Yate's Selected Peach	10	100
17. King Humbert	8	100
18. Pritchard	8	100
19. Greater Baltimore	8	100
20. Red Plum	10	100
21. Yellow Cherry	10	100
22. Burpee's Self-Pruning	10	100
23. Albino	10	100
24. Sutton's Early Red Milan	10	100
25. Golden Queen	8	100
26. Early Detroit	10	100
27. Stone Dwarf	10	100
28. Bonny Best	10	100
29. Marglobe	10	100
30. Livingston's Globe	10	100
31. Earliana	8	100
32. Best of All	10	100

During the years 1933 to 1937, we discovered the following food plants and weeds which were found to naturally harbor *H. marioni* at their roots. In this preliminary list of host plants of *H. marioni* in Kwangtung, the plants are arranged alphabetically. Every host plant represents a first record for Kwangtung except *Lycopersicum esculentum* which was previously reported to harbor *H. marioni* by Tu. Many of the diseased specimens are being kept in the Helminthological Collection, Department of Biology, Lingnan University.

A Preliminary List of Host-plants of *H. marioni* in Kwangtung²

<i>Abelmoschus esculentus</i> L.	*	(okra)
<i>Ageratum conyzoides</i> L.		
<i>Allium cepa</i> L.		(onion)
<i>Apium graveolens</i> L.		(celery)
<i>Beta vulgaris</i> L.		(beet)
<i>Blumea hieracifolia</i> DC.		
<i>Brassica</i> sp.		(kai-tsoi)
<i>Brassica</i> sp.		(kai-lan)
<i>Canavalia gladiata</i> DC.		(sward bean)
<i>Carica papaya</i> L.		(papaya)
<i>Cucumis sativus</i> L.		(wong kua)
<i>Cucumis</i> sp.		(paak kua)
<i>Cucurbita maxima</i> Duchesne		(squash, including 9 cultivated varieties)
<i>Daucus carota</i> L. var. <i>sativa</i> DC.		(carrot)
<i>Ipomoea reptans</i> (Linn.) Poir		(ung tsui)
<i>Lactuca sativa</i> L.		(lettuce, including 2 cultivated varieties)
<i>Lycopersicum esculentum</i> Mill		(tomato, including 32 cultivated varieties)
<i>Morus alba</i> L.		(mulberry)
<i>Oxalis Martiana</i> Zucc.		
<i>Petroselinum hortense</i> Haffn.		(uen sai)
<i>Phaseolus vulgaris</i> L.		(tsin-tau-kok)
<i>Pisum sativum</i> L.		(ho-lan-tau)
<i>Solanum melongena</i> L.		(eggplant, including Ho-pau-khi and Chhau-khi)
<i>Spinacia oleracea</i> Mill		(spinach)
<i>Vigna sinensis</i> (L.) Saui ex Hassk.		(cow pea)
<i>Viola</i> sp.		(violet) *

Literature

GOODEY, T.

1933. Plant parasitic nematodes and the diseases they cause. xx and 306 p., 136 fig. Methuen & Co., Ltd., London.

FAJARDO, T. G. AND PALO, M. A.

- 1933 The root-knot nematode, *Heterodera radicola* (Greef) Muller, of tomato and other plants in the Philippine Islands. *Phil. Jour. Sci.* 51(4):457-485, 8 pl.

LI, L. Y.

1935. A preliminary report on the occurrence of *Tylenchulus semipenetrans* Cobb in the roots of *Citrus* nursery plants of South China. *Ling. Sci. Jour.* 14(2):881-888.

TU, C.

1932. Notes on diseases of economic plants in South China. *Ling. Sci. Jour.* 11(4):489-504, 17 pl.

² The writers are indebted to Dr. F. P. Metcalf, Curator of Herbarium, and Professor of Botany, Lingnan University, for the identification of many host plants listed above.

廣東有經濟價值的植物及雜草
的根部寄生蟲 (*Heterodera marioni*)

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嶺南大學園藝系 李德銓合著

(摘要)

Heterodera marioni (Greer) 乃廣東菜蔬及雜草根部之普遍害蟲。感染者發育不展及呈凋萎之狀態。長成雌蟲，其體度 $850\mu \times 620\mu$ ；卵 $95\mu \times 41\mu$ ；雄蟲則 $1,250\mu \times 313\mu$ 。此害蟲之幼虫，對於乾燥與汙濫，皆有敏銳之覺性。應用菜蔬與稻類之輪種法，諒是防治此病之一法。在嶺南大學培植之蕃茄三十二種。及南瓜類九變種，皆感染此病，且感染之成數，幾達百分之一百。文中有一被害植物之初步名表，共有廿六種。

FURTHER NOTES ON SCHANNID FISHES OF CHINA

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(Concluded from *Lingnan Science Journal* Vol. 17, No. 3, p. 381.)

Nibea Jordan & Thompson

Nibea Jordan & Thompson, 1911, Proc. U.S. Nat. Mus. 39:244, 246.
[Type, *Pseudotalithus natsukurii* Jordan & Snyder, designated by Jordan,
1920, The Genera of Fishes, pt. 4, p. 539.]

Oblong, compressed; snout prominent, bluntly pointed, with 4 pores at tip of snout, the upper 3 in a transverse series, the lower median one circular, near rostral margin. Rostral fold more or less lobate. Mouth of moderate size, slightly oblique or horizontal, terminal or inferior; maxillary concealed for most part under preorbital sheath, not provided with a circular pore as in *Collichthys* and *Pseudostictaena*. The outer series of premaxillary and inner mandibular teeth conspicuously enlarged, none canine-like. 5 conspicuous pores on chin as in the case of *Johnius*; a flat small tubercle usually present in median pore; no barbels. Preopercular limb slightly slanting backward or vertical, provided with serrae or crenulae. Operculum terminating in two flat points, the lower longer. Branchiostegal 7; gillrakers few, short or moderately long, 12-27 on anterior arch. Pseudobranchiae. Dorsal with 10 to 11 spines and 21 to 33 soft rays; anal short with 2 spines and 7 to 8 rays; second anal spine weak or very strong; both soft dorsal and anal usually devoid of scales; scales on body ctenoid. Vertebrae 24 to 25.

Fishes of this genus are remarkable for the naked soft dorsal and anal, unpaired pores on chin, and the enlarged inner series of mandibular teeth. They differ from *Johnius* in having distinct inner series of mandibular teeth, and from *Argyrosomus* in having large, unpaired pores on chin, and the lower jaw somewhat shorter.

Fishes living in seas, in brackish water of estuaries of China and Japan. All the species of this genus are common and important food fishes in China, Chosen, and Japan.

Analytical Key to Species of *Nibea*

1. Second anal spine feeble, 5.3 in head, at most half as long as first anal ray; head slightly depressed and pointed; D. X/1/26; A. II/7; soft dorsal and anal naked *acuta*
- Second anal spine of considerable strength, 2-2.5 in head; head not pointed, D. X/1/21-30; A. II/7-8; soft dorsal with basal scaly sheath only 2
2. Soft dorsal rays 25-31, usually more than 26; gillrakers of anterior arch more than 16 3
- Soft dorsal rays 21-23; gillrakers less than 13, very short 4

3. Upper jaw prominent, gillrakers 5+10-11 *albiflora*
 Jaws about equal in front; gillrakers 7+15-18 *mitsukurii*
4. Gillrakers 4+7, very short, some rudimentary; body with irregular black spots arranged more or less in the form of bands, quite conspicuous above lateral line, becoming pale and indistinct as they proceed downward to abdomen; spinous dorsal black terminally; two rows of large, widely set spots on spinous and soft dorsal; D. X/1/22; II/7 ... *goma*
 Gillrakers 4+8-9, comparatively long, extreme ones rudimentary; coloration slate gray in adult specimens; in young 4 to 5 broad vertical bands on upper half of body, darker above and pale below; these bands sometimes disfigured into large ill-defined dark spots; pectorals, ventrals, caudal and anal deep black in young, dark in adult... *diacanthus*

Nibea acuta (Tang)

Pseudosciaena acuta Tang, 1937, Amoy Mar. Biol. Bull. 2(2) :62, fig. 5
 (Hainan, Kwangtung).

X/1/26; A. II/7; P. 1/17; V. 1/5. L.l. 49 tubular scales; l.tr. 6/14. Depth in length 4.1; head 3.3. Eye in head 6.2; snout 3.8; postorbital space 1.6; interorbital 5.3; pectoral 1.2; dorsal spine 2.4; ventral 1.8; second anal spine 5.3 in head, slightly longer than eye diameter; length of peduncle 1.2 in head and 3 times longer than its least depth, that goes 3 in head.

Oblong, compressed; head bluntly pointed and slightly depressed; snout somewhat truncate, prominent and provided with 4 pores, the upper three in a curved series, the lower median one very conspicuous, situated just above the broadly lobate rostral margin, the posterior incisions of which are rather deep, the middle incision shallow but distinctly visible. Mouth rather wide, inferior, very slightly oblique with the lower jaw included, maxillary concealed for most of length under preorbital sheath, much dilated posteriorly; depth of dilated portion equal to eye diameter, no maxillary pore, distal end extending to hind margin of orbit. Five large and conspicuous pores on chin, the median pore provided with a round tubercle which is continuous from labial fold just behind mandibular symphysis, and dividing the pore into a crescentic groove with both terminals rather deep and slightly enlarged; lateral pores deep and slit-like. Labial folds laterally developed. Bands of villiform teeth on upper jaw broad, the outer series enlarged, 3 to 4 enlarged teeth in front canine-like, but not so strong as in *Otolithes*; inner series of mandibular teeth enlarged, not so strong as upper enlarged ones, small villiform teeth in one or two outer series and inserted between them; front canine-like teeth of upper jaw exposed when mouth is closed. Vomer and palate edentate. Tongue free, with roundish tip. Eyes situated high, in anterior half of head. Interorbital flat; nostrils large, posterior one circular, close to eye, anterior slit-like. Preopercular limbs finely and widely serrated, slanting slightly backward, with its angle round; operculum terminating in a flat spine not extending beyond the membrane. Branchiostegal 7. Gillrakers very short, 4+8 (rudimentary ones included) on anterior arch,

longest about 1/5 filaments, which are about half as long as eye diameter. Pseudobranchiae present.

Spinous dorsal with a deep notch, first spine short, third spine longest; soft dorsal rays slightly shorter than longest spine; first ventral ray filamentous, not to vent; anal origin below 10th or 11th soft dorsal ray, second anal spine slender, feeble, half as long as first anal ray, and slightly longer than eye diameter, caudal wedge-shaped. Top of head, nape, opercles, body and tail covered by ctenoid scales; snout, interorbital, suborbitals and bases of soft dorsal, anal, and caudal covered by small cycloid scales. Soft dorsal and anal devoid of scales, except the narrow basal sheath which consists of 2 series of cycloid scales. Vertebrae 24.

Each scale above lateral line and 3 series below is marked with a roundish small brown spot at its posterior margin, forming 6 series of spots above and 3 below. The soft dorsal is maculated by 2 rows of small roundish spots. Spinous dorsal blackish terminally; an oblong, distinct dark blotch on upper half of operculum.

One specimen 230 mm. to base of caudal collected from Yangkiang District, southern Kwangtung.

My specimen agrees with Tang's description in most respects except coloration. The horizontal series of brown spots on back are neither mentioned in Tang's description nor indicated in his figure. Tang's figure of *Pseudosciaena acuta* shows 26 soft dorsal rays, while his description says 28. In this case the figure is probably correct.

Nibea albiflora (Richardson)

Corvina? albiflora Richardson, 1846, Ichth. China, Japan, p. 226 (type locality : Canton).

Pagrus macrocephalus Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10:222, pl. 3, fig. 1 (type locality : Gulf of Pechili and Oriental Sea, Peking).

Sciaena ten-lo Basilewsky, 1855, Nouv. Mem. Soc. Nat. Moscou 10:220, pl. 1, fig. 3 (type locality : Gulf of Pechili, Peking).

Corcina macropthalmus Bleeker, 1873, Nederl. Tijdschr. Dierk. Amsterdam 4:117 (China).

Sciaena albiflora Gunther, 1873, Ann. & Mag. Nat. Hist., ser. 4, 12:378 (Cheefoo); Regan, 1905, Ann. & Mag. Nat. Hist., ser. 7, 15:20 (Inland Sea of Japan); Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:249, fig. 2 (Port Arthur, Manchuria); Jordan & Metz, 1913, Mem. Carnegie Mus. 6(1): 36, fig. 27 (Port Arthur, Fusan, Chinnampo).

Sciaena (Corvina) albiflora Steindachner, 1829, Denk. Akad. Wiss. Wien, math.-nat. Kl. 59(pt. 1):361 (Shanghai).

Nibea albiflora Jordan & Hubbs, 1925, Mem. Carnegie Mus. 10(2):243 (Fuknoka); Chu, 1931, Index Pisc. Sinen., p. 133 (compiled); Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):22, fig. 12 (Chekiang; Shantung); Wang, 1935, Contrib. Biol. Lab. Sci. Soc. China 10(9):443, fig. 29 (Cheefoo); Chu, 1931, Index Pisc. Sinen., p. 133; Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):31, fig. 1, A, A' (Fusan).

Sciaena (Nibeä) albiflora Wu, 1931, Sinensis 1(11):167 (Chusan, Chekiang).

D. X/1/28-30; A. 11/7; V. 1/5. L.i. with 51 tubular scales; ltr. 6/14; predorsal scales 40. Depth 3.5; head 2.5. Eye 3.7; snout 2.6; interorbital 4.7; longest dorsal spine 1.8; longest anal spine 2.5; depth of peduncle 3.2; its length about 1. Depth of peduncle in its length 3.

Body rather deep, oblong, compressed. Head tapering. Snout short, bluntly pointed. Mouth of moderate size, terminal, slightly oblique. Lower jaw included; maxillary extending to posterior half of orbit. Lips rather thick, with margin fringed. 5 pores on under-side of mandibular symphysis. Rostrum with a broad central lobe; 2 pores on side and 4 more in center of the lobe. Villiform teeth on jaws, outer upper series of teeth enlarged, being stronger than those enlarged teeth of inner lower series. No canine. Vomer and palate edentate. Tip of tongue round. Barbels at chin absent. Eyes with free rim. Interorbital convex. The whole head except lips, jaws and under surface is covered by scales. Preopercular edge serrated, the angular spines stronger. Operculum terminating in two weak points. Branchiostegals 7. Gillrakers 5+10-11, extreme one rudimentary, longest 2.8 in eye diameter, about five-eighths of gill-filaments. Pseudobranchiae present. Dorsal origin above middle of base of pectorals provided with a deep notch between spinous and soft portions. First dorsal spine minute, third spine longest. Dorsal and anal devoid of small scales in mature specimens, but in younger specimens there are one or two small cycloid scales on the membrane just above the basal scaly sheath, which is composed of cycloid scales. The scaleless portion of the soft dorsal and anal is more than four-fifths of the fins in height. Anal commences behind middle of soft dorsal base, its origin opposite to 15th soft ray. Second anal spine strong, in young specimens more than four-fifths of the longest anal ray, in mature specimens comparative shorter; pectorals 1.4 in head. Ventrals thoracic, slightly shorter than pectorals. Caudal cuneate. Lateral line with 51 tubular scales. Sensory tube on scales of lateral line with 51 tubular scales. Sensory tube on scales of lateral line branched. Scales on snout and cheek cycloid; on interorbital, opercles and body ctenoid. Scales below spinous dorsal wider than long, with 11-14 basal radii; 58-62 apical denticles. Intestine short, with 5 pyloric caeca. Air-bladder simple extending the whole abdominal cavity, provided with 14 pairs of arborescent appendages. 3 or 4 more pairs of simple, unbranched appendages at the posterior end of the air-bladder. Vertebrae 25. Peritoneum gray.

Light brownish, darker above and pale silvery below. A black spot at the joining point of three scales forming oblique bands above lateral line. Bands below lateral line more or less horizontal. Pectorals, ventrals and anal yellowish-brown. Edge of spinous and soft dorsal black. Spinous dorsal dusted. One row of black spots along the lower half of soft dorsal. Margin of caudal blackish. Iris bright brownish.

One specimen 282 mm. to base of caudal collected from Chusan. Other specimen 294 mm. from Shantung. This species is not uncommon in Chusan. 14 specimens 123 to 290 mm. from Kwangtung; one specimen 189 mm. from Foochow; one specimen 168 mm. from Fusen, Chosen.

Nibea mitsukurii (Jordan & Snyder)

Corvina cuja Schlegel, 1849, Fauna Japonica, Pisces, p. 58 (Nagasaki), not *Bola cuja* Buchanan-Hamilton.

Pseudotolithus mitsukurii Jordan & Snyder, 1901, Proc. U. S. Nat. Mus. 23:356, pl. 13 (type locality: Bay of Tokyo); 1901, Annotat. Zool. Japonicae 3:81 (Yokohama); Smith & Pope, 1906, Proc. U. S. Nat. Mus. 31:478 (Kochi).

Pseudosciaena mitsukurii Franz, 1910, Abb. bayer Akad. Wiss. 4 (suppl. Vol. 1):45 (Yokohama).

Sciaena mitsukurii Jordan & Thompson, 1911, Proc. U. S. Nat. Mus. 39:246, fig. 1 (Tokyo, Awa, Mitsuishiwa, Wakanoura); Snyder, 1912, Proc. U. S. Nat. Mus. 42:416 (Tokyo); Jordan & Thompson, 1914, Mem. Carnegie Mus. 6(4):258, pl. 42, fig. 1 (Sendai); Tanaka, 1916, Figures and descriptions of the fishes of Japan 10:177, pl. 48, fig. 187, pl. 49, fig. 189-190 (Tokyo).

Sciaena albiflora Regan, 1905, Ann. & Mag. Nat. Hist., ser. 15, 7:20 (Inland Sea of Japan); Jordan, Tanaka & Snyder, 1913, Jour. Coll. Sci. Tokyo Imp. Univ. 33(1):178 (Japan); Tanaka, 1930, Zool. Mag. Tokyo 42(505):438 (Onahama, Hukniken).

Sciaena (Nibea) mitsukurii (part) Schmidt, 1931, Trans. Pacif. Comm. Acad. Sci. USSR 2:71 (Tokyo).

Nibea mitsukurii Jordan & Hubbs, 1925, Mem. Carnegie Mus. 10(2):27, p. 243 (Toba, Shizuoka, Choski); Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):29, fig. 1, B,B' (Siogama, Tokyo Bay, Miya).

Johnius catus Fowler, 1933, U. S. Nat. Mus. Bull. 100, 12:390 (Japan).

Only known in Japanese Sea, not seen by me.

Nibea goma (Tanaka)

Sciaena goma Tanaka, 1915, Zool. Mag. Tokyo 27:615 (type locality: Nagasaki); 1916, Figures and descriptions of the fishes of Japan, 22:392, pl. 107, fig. 327 (Nagasaki).

Johnius goma Fowler, 1933, U. S. Nat. Mus. Bull. 100, 12:394, (copied).

Nibea goma Lin, 1935, Bull. Chekiang Prov. Fish. Expt. Sta. 1(1):15, fig. 8 (Shantung); Matsubara, 1937, Jour. Imp. Fish. Inst. 32(2):37 (China Sea).

Pseudosciaena goma Tang, 1937, Amoy Mar. Biol. Bull. 2(2):57, fig. 3 (Foochow).

D. X/1/22-23; A. 11/7; V. 1/5. L.I. with 50 tubular scales; l. tr. 6.7-13.18, predorsal scales 40. Depth in length 3.8; head 3.1. Eye in head 6.5; snout 4; interorbital 5; longest dorsal spine 2; second anal spine 3; peduncle length 1.2, its depth 3.6. Peduncle depth in its length 1.8.

Oblong, compressed. Whole body, except snout, preorbital, and jaws, covered by weakly ctenoid scales. Head pointed. Mouth nearly horizontal with the upper jaw slightly projecting beyond the lower. Five distinct pores, arranged in a half circle on the under-

side of mandibular symphysis, the middle pore more or less crescentic or circular in form, the posterior pores slightly larger than the anterior ones; 3 or 4 pores on snout. Rostrum lobate. Lips thick with fringed edge. No barbels on chin. Maxillary extending to, or slightly beyond, vertical from posterior margin of orbit, concealed for most part under preorbital sheath. Interorbital convex. Preopercular edge finely serrated, its angle rounded. Operculum terminating in two points, the lower middle point much longer, but becoming short and about equal behind with age. Branchiostegals 7. Gillrakers short and small, some rudimentary, 4+7 on the anterior arch, longest raker 4.5 in eye diameter or in gill-filament. Pseudobranchiae present. Dorsal origin opposite base of pectorals; dorsal with a deep notch between spinous and soft portions. First dorsal spine minute, 3rd or 4th one longest. Anal originates under middle of soft dorsal base, opposite to the 8th or 9th dorsal ray. Second anal spine strong, slightly longer than half the first anal ray, longer than snout but much shorter than postorbital space. Pectorals rather short, about half the head length; ventral thoracic as long as pectorals. Caudal cuneate. Scales cover base of soft dorsal and anal in one and a half rows only. Scales on head, opercles, and body all over ctenoid, some crenulated, wider than long, with about 18 divergent basal radii; 40-44 apical denticles, circuli fine; those on snout and preorbital cycloid. The basal radii increase in number with age. Intestine short, in one coil, with 5-8 pyloric caeca; stomach long and large. Air-bladder simple, lying the whole abdominal cavity, provided with 20 pairs of appendages. Peritoneum white. Vertebrae 24.

Irregular black spots, arranged more or less in the form of horizontal bands on side of body, very distinct above lateral line, becoming pale and indistinct as they proceed downward to abdomen. Spinous dorsal black terminally; two rows of large, widely set spots on spinous and soft dorsal. Caudal with 2 or 3 series of spots. Pectorals, ventrals and anal blackish. Spots on head small.

One specimen, 203 mm. to base of caudal, collected from Shantung, in the Zool. Lab. of Chekiang Prov. Fish. Expt. Sta.; 3 specimens 320-345 mm. collected from Chusan Islands in Kiangsu Fish. Expt. Sta., Shanghai.

Nibea diacanthus (Lacépède)

Lutjanus diacanthus Lacépède, 1802, Hist. Nat. Poiss. 4:195, 240 ("La Collection Hollandaise cedee a France") (no locality).

Johnius diacanthus Cantor, 1849, Jour. Asiat. Soc. Bengal 18(pt. 2) : 1049 (Penang, Malay Peninsula, Singapore); Mason, 1860, Burmah Nat. Resources, p. 695 (Burma); Kner, 1865, Reise Novara, Fische, p. 133 (Madras and 50 miles off Ceylon); Fowler, 1926, Jour. Bombay Nat. Hist. Soc. 30(4) : 777 (Bombay); 1928, ibid. 33(1) : 115 (Bombay); 1929 (1930), p. 596 (Shanghai); p. 611 (Hong Kong); 1933, U. S. Nat. Mus. Bull. 100, 12 : 374 (Bombay).

Sciaena diacanthus Gunther, 1860, Cat. Fish. Brit. Mus. 2:290 (China, Bay of Bengal, Malayan Peninsula, Calcutta); Day, 1865, Proc. Zool. Soc.,

London, p. 18 (Cochin-China, Malabar); 1876, *The Fishes of India*, pt. 2, p. 189 (Hooghly, high as Calcutta); Karoli, 1881, *Term. fuzetek* 5:159 (Singapore); Day, 1889, *Faun. Brit. India, Fishes* 2:118; Elera, 1895, *Cat. Fauna Filip.* 1:501 (Manila, Luzon); Duncker, 1903[1904], *Mitteil. Naturh. Mus. Hamburg* 21:154 (Kudla Selangor); Seale, 1914, *Phil. Jour. Sci.* 9(1):68 (Hong Kong); Vinciguerra, 1926, *Ann. Mus. Civ. Stor. Nat. Genova*, ser. 3, 10:578 (Sarawak).

Pseudosciaena diacanthus Bleeker, Verh. Akad. Amsterdam 14(4):27 (Singapore, Penang, Banka, Java, Madura); 1877, *Atlas Ichth.*, Vol. 9, pl. (5)388, fig. 2; Seale, 1910, *Phil. Jour. Sci.* 5(4):279 (Sandakan, Borneo); Weber & de Beaufort, 1936, *Fish Indo-Austr. Archipel.* 7:515 (Singapore, Penang, Banka, Java; Madura, Borneo); Tang, 1937, *Amoy Mar. Biol. Bull.* 2(2):58 (Amoy).

Johnius catuleus Cuvier, 1829, *Regne Animal*, ed. 2, 2:173 (on Katchelee Russell, 1803, *Fishes of Coromandel*, 2:12, pl. 116, type locality: Vizagapatam); Valenciennes, 1839, *Regne Animal*, Cuvier, ed. 3, Poiss., p. 81.

Corvina catala Cuvier, 1830, *Hist. Nat. Poiss.* 5:128 (type locality: Pondicherry; Malabar); Richardson, 1846, *Ichth. China, Japan*, p. 226 (China Sea; Canton).

Bola chaptis Buchanan-Hamilton, 1822, *An account of the fishes found in the river Ganges and its branches*, p. 77, 368, pl. 10, fig. 25 (type locality: Ganges estuaries).

Corvina chaptis Cuvier, 1830, *Hist. Nat. Poiss.* 5:130 (on Buchanan-Hamilton); Blyth, 1860, *Jour. Asiatic Soc. Bengal* 29:141 (Sitang River).

Johnius maculatus Blyth, 1860, *Jour. Asiatic Soc. Bengal* 29:141 (Sitang River).

Johnius valenciennii Eydoux & Souleyet, 1841, *Voy. Bonite, Zool.* 1:159, pl. 1, fig. 2 (type locality: China Sea near Macao).

Corvina nigromaculata Borodin, 1930, *Bull. Vanderbilt Mar. Mus.* 1(art. 2): 53, pl. 2, fig. 2 (type locality: Ceylon).

Pseudosciaena maculata Tang (not Bloch Schneider), 1937, *Amoy Mar. Biol. Bull.* 2(2):55 (Foochow).

Bola diacanthus Chu, 1931, *Index Pisc. Sinen.* p. 136 (compiled).

D. X/1/22; A. II/7-8; V. 1/5. L.l. 50-51 tubular scales; l. tr. 6-7/16-18 to abdomen. Depth in length 3.4-5; head 3-5. Eye in head 5-10; snout 3.8; longest dorsal spine 2.3; dorsal ray 3.2; second anal spine 2.7-4.5; first anal ray 2.6; pectoral 1.8; depth of peduncle 4; its length 1.2. Depth of peduncle in its length 3.3.

Oblong, compressed; head bluntly pointed, snout roundish, not overhanging the upper lip, with 3 pores in an upper series over a median larger pore, which is located immediately above margin of rostral fold. Edge of rostral fold incised into 2 lobes by 3 incisions, lateral incision deep; median one slightly emarginate. Lips thick, edge finely cut; lower portion of posterior dilated end of maxillary exposed, the rest entirely concealed under preorbital sheath, extending to below hind border of eye. 5 distinct pores on chin, lateral pores large and slit-like, most posterior one rather deep, median pore with a flat tubercle in center, connecting the labial fold in front, laterally deepened. Thus the median pore sometimes might be wrongly considered two pores. No barbel. Mouth terminal, horizontal, rather wide, lower jaw slightly shorter than upper. Outer series of premaxillary teeth enlarged, conical, not true canine-like,

increased in size toward anterior, exposed when the mouth is closed, inner villiform teeth in broad band, not continuous at symphysis; inner series of mandibular teeth enlarged in a single series, smaller than upper enlarged teeth, decreased in size towards front, outer lower teeth small, not feebly villiform, in one or two series. Vomer and palate edentate. Eyes small, lateral, entirely in anterior half of head, and above the level through commencement of mouth cleft. Interorbital convex. Preopercular limb slightly slanting backward, with short but distinct and widely set serrature, angle round, serrae on lower limb not conspicuous; operculum terminating in two short, blunt and closely set points, lower one longer. Gillrakers 5+8 or 9 with one or two more rudimentary tubercles at extremes, all very short and stout, one-third gill-filaments or eye. Pseudobranchiae.

Spinous dorsal with a deep notch, first dorsal spine minute, third spine longest, about 2.3 in depth of body, soft dorsal lower than spinous dorsal; anal commencing below 8th or 9th soft dorsal ray and ending far before dorsal axilla, first anal spine minute, second anal spine robust about half as long or longer than half of first anal ray, more than twice eye diameter and slightly shorter than snout. First ventral ray not filamentous. Scales on head and body strongly ctenoid except on snout and preorbital and some on suborbital, which are completely cycloid or sometimes weakly ctenoid; the two series of small scales forming dorsal basal sheath also ctenoid; scales below spinous dorsal longer than wide, about 30 basal radii, circuli fine; sensory tube on scales of L.I. branched. Intestine short. Pyloric caeca 8. Vertebrae 23 (12+11).

In adult body is uniformly dark slate color, edge of spinous and soft dorsal with a broad black band below which is one or two series of large black spots; anal and paired fins entirely black, becoming pale with age, very dark in young; caudal dark, its lower half deep blue to black. In young individuals 5 faintly visible broad vertical bands on body darker above lateral line, one on caudal peduncle, two below soft dorsal, one below spinous dorsal and one on nape. sometimes these bands changed into irregular blotches or spots of various size; a large dark blue opercular blotch present; mouth and abdominal cavity white.

3 specimens, 108, 116, and 330 mm to base of caudal, collected from bag net fishing ground near Chusan; one specimen 1700 mm. from East Saddle Island, Kiangsu. The fish of 1200-1800 mm. are fairly common in Chusan Archipelago. The best fishing season extends from the middle of June to about August, when the fish come near shore to feed.* In the months of October, November and December they are caught 20 to 50 miles off Chusan where the water ranges from 20 to 40 fathoms in depth.

* Whether the fish come near shore to feed or to spawn is still open to question.

The type locality of *Nibea diaoanthus* (Lacèpéde) is unknown, though the fish is generally regarded as an East Indian species. Judging from its huge size and migratory habit it seems to be a widely distributed species. Its haunt in Chinese seas and estuaries would naturally be expected. *Nibea goma* (Tanaka) is very closely related to *Nibea diaoanthus* (Lacèpéde) and I even once regarded the species as identical. But based on coloration and number and size of the gillrakers they should be separated as two valid species, as already stated in the analytical key and in the description of the individual species. Tang (1937) referred a fish from Foochow to *Johnius maculata* Bloch Schneider, which should be a young of *Nibea diaoanthus*, although authenticity of the type specimen of *Johnius maculata* is still questionable. *I'seudosciaena diaoanthus* Tang is doubtful because he says "4 inconspicuous pores at chin."

References

BASILEWSKY, S.

1855. Ichthyographia Chiae Borealis. *Nouv. Mem. Soc. Nat. Moscou* 10 :215-264, 9 pl.

BLEEKER, P.

1863. Description de quelques espèces de poissons nouvelles ou peu connus de Chine envoyées au Musée de Leide par M. G. Schlegel. *Nederl. Tijdschr. Dierk. Amsterdam* 1(69) :135-150.
1865. Notice sur les poissons envoyés de Chine au Musée de Leide par M. P. Schlegel. *Nederl. Tijdschr. Dierk. Amsterdam* 2(1-3) :55-62.
1877. Atlas ichthyologique des Indes orientales Néerlandaises. Vol. 9, Amsterdam.
1879. Sur quelques espèces inédite ou peu connus de poissons de Chine, appartenant au Muséum de Hambourg. *Versl. Akad. Amsterdam*, ser. 4, 2(18) :1-17, 2 pl.

CHEVEY, P.

1834. Revision synonymique de l'Oeuvre ichthyologique de G. Tirant. *Inst. Oceanogr. l'Indo-China, Note*, No. 7, p. 7-291.

CHU, Y. T.

1931. Contributions to the ichthyology of China. *China Jour.* 15(5) : 246-247, pl.
1931. Index Piscium Sinensium. *Biol. Bull., St. John's Univ.*, No. 1, iv and 290 p.

CUVIER, G., AND VALENCIENNES, A.

1830. Histoire naturelles des Poissons Vol. 5.

DAY, F.

- 1878-88. The Fishes of India. being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma and Ceylon. 2 vol., London.

FOWLER, H. W.

1928. The fishes of Oceania. *Mem. Bernice P. Bishop Mus.*, Vol. 10.
1933. Contribution to the biology of the Philippine Archipelago and adjacent regions. *U. S. Nat. Mus. Bull.* 100, Vol. 12, 465 p.
1936. Marine fishes of West Africa. *Bull. Amer. Mus. Nat. Hist.* 70, part 2.

GÜNTHER, A.

1860. Catalogue of the fishes of the British Museum. *Acanthopterygii*. Vol. 2, London.
1873. On a collection of fishes from Chefoo, North China. *Ann. & Mag. Nat. Hist.*, ser. 4, 12 :377-380.
1880. Report on the shore fishes (*In Zoology of the voyage of H. M. S. "Challenger"*). Vol. I, p. 1-82.

HERRE, A. W.

1934. Notes on fishes in the Zoological Museum of Stanford University, 1. The fishes of the Herre Philippine Expedition of 1931.
1934. Hong Kong fishes collected in October-December, 1931. *Hong Kong Nat. Suppl.* 3.
1935. A new Sciaenid from southeastern China. *Ling. Sci. Jour.* 14(4) : 603-604.

JORDAN, D. S., AND EVERMANN, B. W.

1902. Notes on a collection of fishes from the Island of Formosa. *Proc. U. S. Nat. Mus.* 25(1289) :315-368.

JORDAN, D. S., AND HUBBS, C. L.

1925. Records of fishes obtained by David Starr Jordan in Japan, 1922. *Mem. Carnegie Mus.* 10(2) :93-346.

JORDAN, D. S., AND METZ, C. W.

1913. A catalogue of the fishes known from the waters of Korea. *Mem. Carnegie Mus.* 6(1).

JORDAN, D. S., AND SEAL, A.

1905. List of fishes collected in 1882-83 by Pierre Louis Jouy at Shanghai and Hongkong, China. *Proc. U. S. Nat. Mus.* 29(529) :517-529.
1907. List of fishes collected at Hongkong by Captain William Finch, with description of five new species. *Proc. Davenport Acad. Sci.* 10 :1-17, 13 pl.

JORDAN, D. S., AND SNYDER, J. O.

1900. A list of fishes collected in Japan by Keinoske Otaki, and by the U. S. Fish. Comm. Steamer "Albatross" with descriptions of fourteen new species. *Proc. U. S. Nat. Mus.* 23(1213).

JORDAN, D. S., AND STARKS, E. C.

1906. Notes on a collection of fishes from Port Arthur, Manchuria, obtained by James Francis Abbott. *Proc. U. S. Nat. Mus.* 31 (1493) :515-526, 5 fig.

JORDAN, D. S., TANAKA, S. AND SNYDER, J. O.

1913. A catalogue of the fishes of Japan. *Jour. Coll. Sci. Tokyo Imp. Univ.* Vol. 32, No. 1.

JORDAN, D. S., AND THOMPSON, W. F.

1911. Review of Sciaenoid fishes of Japan. *Proc. U. S. Nat. Mus.* 39 (1787).
1914. Record of fishes obtained in Japan 1911. *Mem. Carnegie Mus.* 6 (4) :241-261.

LIN, S. Y.

1934. A study of Foochow fishes. *Ling. Sci. Jour.* 13(4) :671-691, 3 fig.
1935. Notes on some important Sciaenid fishes of China. *Bull. Chekiang Prov. Fish. Expt. Sta.* 1(1) :1-30, 12 fig.

LIN, S. Y., AND HWANG, S. P.

1937. 蔣編影帶魚類繁殖之研究, 第一報告一定產區 [Biological investigation of the bag net fisheries of Chekiang.] *Bull. Chekiang Prov. Fish. Expt. Sta.* Vol. 3, No. 2, 62 p.

MATSUBARA, K.

1937. Sciaenoid fishes found in Japan and its adjacent waters. *Jour. Imp. Fish. Inst.* Vol. 32, No. 2, 92 p.

MORI, T., AND UCHIDA, K.

1934. A revised catalogue of the fishes of Korea. *Jour. Chosen Nat. Hist.*, Vol. 19.

RICHARDSON, J.

1846. Report on the ichthyology of the seas of China and Japan. *Rept. Brit. Assoc. Adv. Sci.*, 15th meeting, p. 187-320.

RUTTER, C. M.

1897. A collection of fishes obtained in Swatow, China, by Miss Adela M. Field. *Proc. Acad. Nat. Sci. Phila.*, p. 56-90.

SCHLEGEL, H., AND TEMMINCK, C. J.

- 1842-50. Pisces. Seibold's Fauna Japonica.

SCHMIDT, P.

1931. Fishes of Japan, collected in 1901. *Trans. Pacif. Comm. Acad. Sci. USSR*, Vol. 2, 185 p.

SCHMIDT, P., AND LINDBERG, G.

1930. A list of fishes, collected in Tsuruga (Japan) by W. Roszkowski. *Bull. Acad. Sci. L. URSS*, p. 1135-1150.

SNYDER, J. O.

1912. Japanese shore fishes collected by United States Bureau of Fisheries Steamer "Albatross" Expedition of 1906. *Proc. U. S. Nat. Mus.*, Vol. 42, No. 1909.

SOWERBY, A. DE CARLE

1930. The naturalist in Manchuria, Vol. 4. The cold-blooded vertebrates and tunicates of the Manchurian region. ii and 321 p., 26 pl., 1 map, Tientsin Press, Tientsin.

STEINDACHNER, F.

1892. Über einige neue und seltene fischarten aus der ichthyologischen sammlung des K. K. Naturh. Hofmuseums Denk. Acad. Wiss. Wien 59(1) :357-384, 6 pl.

TANAKA, S.

1916. Figures and descriptions of the fishes of Japan. Vol. 10.

TANG, D. S.

1937. A study of Sciaenoid fishes of China. *Amoy Mar. Biol. Bull.* Vol. 2, No. 2, 88 p.

TIRANT, G.

1929. Mémoire sur les poissons de la rivière de Hue. *Serv. Oceanogr. Pech. l'Indochine, Note*, No. 6, p. 7-175.

WANG, K. F.

1935. Study of the Teleost fishes of the coastal region of Shantung. II. *Contrib. Biol. Lab. Sci. Soc. China* 10(9) :393-431.

WEBER, M. AND DE BEAUFORT, L. F.

1936. The fishes of the Indo-Australian Archipelago. Vol. 7. Leiden.

中國黃花魚類誌
林書顏著
浙江省水產試驗場
(摘要)

近年來魚類學家研究中國黃花魚類之分類者頗不乏人。如王以康氏(1935)作“山東沿海硬骨魚類之調查”，曾記載黃花魚類十種，其中新種有二。林書顏(1935)研究浙江黃花魚類，由脊椎構造及習性之不同，指出大黃魚與小黃魚為顯然二種。並記載黃唇魚一新種。湯獨新氏(1937)又著述三新種。松原喜代松氏(1937)記載中國及日本海黃花魚類十種。外港鯢魚自 1843 年 Schlegel 氏初次記載後，九十三年之久，無復發見，松原氏此次重見而記載之，甚有價值。Fowler (1933) 及 Weber & de Beaufort 氏(1936)作菲律賓及南洋羣島黃花魚類之研究，供獻至大，惟對中國魚類討論甚簡耳。著者自 1935 年作中國重要魚類誌後，二年間加得標本頗多，本文即重行研究此材料而得之結果，茲將本文記載之二十二種列下：

1. 圓梅童 *Collichthys niveatus* Jordan & Starks
2. 梅童 *Collichthys lucida* (Richardson)
3. 銀牙鱸 *Otolithes argenteus* Curier
4. 大黃魚 *Pseudosciaena crocea* (Richardson)
5. 小黃魚 *Pseudosciaena manchurica* (Jordan & Thompson)
6. 魁魚 *Micichthys miiuy* (Basilewsky)
7. 黃唇魚 *Bahaba fluvolabiata* (Lin)
8. 外港鯢魚 *Argyrosomus japonicus* (Schlegel)
9. 海星魚 *Argyrosomus aeneus* (Bloch)
10. 黑口魚 *Argyrosomus nibe* (Jordan & Thompson)
11. 白米魚 *Argyrosomus argentatus* (Houttyun)
12. 白果子 *Argyrosomus iharae* (Jordan & Metz)
13. 生蠻鱈 *Sciaena duosumieri* (Cuvier & Valenciennes)
14. *Sciaena russelli* (Cuvier & Valenciennes)
15. 黃昌魚(鱈) *Johnius belengerii* (Cuvier) (譯鱈)
16. 白鱈 *Wak cuja* (Buchanan-Hamilton)
17. 丁氏鱈 *Wak tingi* (Tang)
18. 花鱈 *Nibea acuta* (Tang)
19. 黃婆鷄 *Nibea albiflora* (Richardson)
20. *Nibea mitsukurii* (Jordan & Snyder)
21. 花姑魚 *Nibea goma* (Tanaka)
22. 毛帶 *Nibea diacanthus* (Lacèpéde) (毛唇或石客魚)

**A BLOSSOM BLIGHT OF BROAD BEAN (VICIA FABA L.) CAUSED
BY BOTRYTIS CINEREA PERS. UNDER GLASS¹**

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Introduction

On December 25, 1934, the attention of the writer was drawn by Mr. C. Chen, of the Rural Leaders' Training School of Nanking, to a case of broad bean disease in his greenhouse. Only the flowering buds of the plants became blackened and decayed, while the stems and leaves remained in a normal condition. These diseased buds, when brought back to the laboratory, invariably produced, under moist conditions, the typical sporulation of a *Botrytis* species which, after preliminary investigation, was found to be identical with certain cultures of *Botrytis cinerea* that were isolated from the diseased flowers or flowering buds in the field and had been kept under observation for a number of years. In this paper, the morphology, physiology and pathogenicity of this particular strain of *Botrytis cinerea* are discussed.

Historical Review

The literature pertaining to the occurrence of *Botrytis cinerea* on various kinds of plants is voluminous. In fact, the fungus is so cosmopolitan, that Anderson (1924) collected it in Alaska on more than one hundred hosts, which included not only spermatophytes and pteridophytes but also bryophytes.

On the broad bean, the first comprehensive report of its occurrence was in 1931 from Spain, when Sardina (1931) described two new diseases, one caused by *Botrytis fabae* Sardina and the other by *B. cinerea* Pers. The disease caused by the latter fungus is commonly referred to as the "gray rot." Ogilvie and Mulligan (1930), in the same year, recorded *Botrytis cinerea* as a secondary parasite which follows the lesions of *Ascochyta fabae* and leaf spot fungi to cause stem blight. Ikata in his paper on "Red spot disease of broad bean," published in 1933, mentioned the presence of this fungus on decayed flowers under field conditions. Fragmentary notes concerning this fungus on the broad bean were also made by other investigators.

Occurrence

In as much as the blossom blight of broad bean in the field is mostly caused by *Botrytis fabae*, a congeneric form of *B. cinerea*,

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the presence of the fungus under investigation can only be ascertained either by microscopic examination or by isolation. From a study of the diseased bean plants collected during trips to the various principal bean growing regions in Kiangsu and Chekiang Provinces, it appears that the disease is probably co-extensive with the crop. It is also present in certain greenhouses.

Isolation

The fungus is readily isolated on most of the common agars. In the present investigation, isolations were made from diseased flowering buds by the usual procedure of diluting spore suspensions and making single spore transfers to potato-dextrose agar plates. Cultures were prepared from material obtained in several localities. In general, they varied in the rate of conidium and sclerotium production. Since many of them differ from Sardina's fungus (1931) in their readiness to produce sclerotia on the common agar media, a vigorous sclerotium-producing strain, obtained from a diseased flowering bud in the greenhouse, was used, particularly for all inoculation and cultural studies.

Symptoms

The symptoms of this disease in the greenhouse, as well as in the artificial inoculation tests, varied with the amount of atmospheric humidity under which the plants were growing. In the greenhouse, where the humidity was usually not so high, the fungus blighted floral parts only and seldom infected either the stems or the leaves. On the flowers, the first sign of the disease is the appearance of tiny, light yellow to brown, water-soaked spots or lesions. These lesions enlarge rapidly and at the same time turn dark brown in color. On the open flowers, lesions are found in great abundance on the petals. Withering and collapsing of the flowers may start from any part of the flower, but especially at the tips. Finally, the flowers become black and brittle. In the greenhouse, the most destructive stage of the disease is the killing of the young flowering buds, thus resulting in the barrenness of the plants.

Under very humid conditions, as in a moist chamber, the infected floral parts became black, soft and slimy. Sooner or later, a dense layer of gray mold consisting of comparatively short conidiophores and myriads of conidia was produced on them (pl. 21, fig. 1 to 6). The spread of the disease from the diseased to healthy flowers by contact was very common (pl. 21, fig. 1). When artificially inoculated, the fungus produced tiny black spots on the leaf blades. If the spots were very numerous, the leaves soon became flabby and finally became blackened. When only a few spots were present, they enlarged to form large black discolorations. Under favorable conditions, the lesions enlarged still further, coalesced and frequently involved the entire leaf blade. Black areas along the margins of the

leaves also resulted. At a later stage, abundant sporulation was often produced on the killed plant tissues. In the field or in the moist chamber, the infection of the leaves is usually traceable to a small bit of diseased inflorescence that has fallen from above. On the stem, the first symptom of the disease was the appearance of black discolorations of various shapes and sizes. They enlarged rapidly through the main stem and caused the latter to weaken at the point of attack and to break over. If the lesion was near the base, the whole plant toppled over; if it was high up, the tip of the stem drooped. In most cases, tip blight of the stem resulted (pl. 22, fig. 1).

The Causal Fungus

Botrytis cinerea Pers., causing the blossom blight of broad bean, consists of hyaline, septate and intercellular mycelia. They contain fine granules and have numerous branches arising irregularly at acute angles from the main filaments. The place of branching is more or less constricted. Only in the advanced stage of the disease do they become intracellular.

The hyphae produced in the agar cultures varied from 3.8μ to 11.4μ in width. The young branches are narrower than the main filaments, and are hyaline, septate and rich in protoplasmic granules. The old hyphae are also hyaline and septate but are more or less empty. Anastomosis of hyphae occurs infrequently.

The conidiophores are produced directly either from the free mycelia or sclerotia. The cells of mycelia from which the conidiophores rise may protrude slightly upward, serving as the base of the conidiophore, or may connect with the latter without the protrusion (pl. 23, fig. 2 b). In the former case, the cells take the color of the conidiophore; while in the latter, they are hyaline and formed of root-like hyphal threads. The conidiophores are long, erect, branched, many-septate, pale smoky color at first, broader at the base and often tapering gradually toward the apex (pl. 23, fig. 2 a & c). When old, they become yellow, flattened and twisted (pl. 23, fig. 2 d). The diameter of the conidiophores varies from 5.8 - 18.9μ , while the length depends mainly on the substratum on which they are produced. In culture plates, they are rather erect or creeping, and measure from 0.5 to 7-mm. in length. In general, they are shorter when found on the diseased plant tissues. The tips of the conidiophores are hyaline, richly protoplasmic, and gradually tapering toward the apex. Preliminary to spore production, they send out side branches which in turn branch once or twice. The swollen tips of the branchlets produce sterigmata on which large numbers of conidia are produced (pl. 23, fig. 2 a). A cluster of conidia is thus formed. These spore clusters are formed apically at first, but gradually shift into the lateral position as a result of the elongation of the conidiophore tips. In this manner, as many as twenty or

more spore clusters may be produced on a single conidiophore (pl. 23, fig. 2 d). Under natural conditions, 6 to 8 spore clusters per single conidiophore is very common. The distance between two clusters is from 63 to 890 μ .

Conidia are borne singly and acrogenously on branches of the conidiophore and are hyaline, continuous, oval, oblong or elliptical (pl. 23, fig. 1 a). They vary in size over a considerable range from 7.2 to 19.8 μ in length. When a large number of spores are measured, a majority of them fall, however, within a narrow range and do not depart greatly from the mean length. This is shown graphically in figure 1. For comparison, the spore measurements of *Botrytis cinerea* on broad bean obtained by the writer and those by the previous investigators are given as follows:

Sources	Dimensions	Range	Mode	Mean	P.E. of mean	Standard deviation	Author
Flower	Length	7.2-19.8	11.4	10.8	\pm 0.2048	5.2	Writer
	Width	6.1-13.7	7.6	8.3	\pm 0.0748	1.9	
Potato-dextrose agar	Length	7.8-18.6	11.9	10.3	\pm 0.1732	4.4	do
	Width	6.3-12.5	7.5	8.2	\pm 0.0632	1.6	
Flower	Length	8-17		12.37			Ikena
	Width	7-13		9.67			
Leaf	Length	9-17		12.87			do
	Width	7-11		8.92			
Plant	Length	8-17					Sawada
	Width	6-10					
Plant	Length	8-17					Ideta
	Width	6-10					

Appresoria are commonly found in the agar cultures. They arise either terminally or laterally at points where the mycelium comes in contact with the glass container of the culture. Formation consists of the swelling of the hypha tip, branching and rebranching of this swollen portion of the hypha, and the formation of a mass of dark-colored somewhat modified mycelial cells. At first, they are composed of a loose mass of hyaline hyphae which contain dense cytoplasm. When old, the mycelial threads become compact and more or less radiate in arrangement (pl. 23, fig. 3 a & b). The cell wall becomes darker in color. Macroscopically, the appresoria are deep green to black and occur singly or aggregated into a line of crust. The young appresoria measure 15-80×30-98 μ while the old ones measure 80-300×80-416 μ .

The strain of *Botrytis cinerea* under investigation produces a great number of sclerotia on the common agar media especially after several transfers. Newly formed sclerotia are white and old ones are slightly green. Finally they become shiny black. The matured sclerotia are circular, elliptical or irregular in outline with the

upper surface flattened or depressed and the under surface concave. The size varies greatly and is considerably affected by the nature of substratum. Thus, in corn meal agar, they measure from 1 to 3.5 mm.

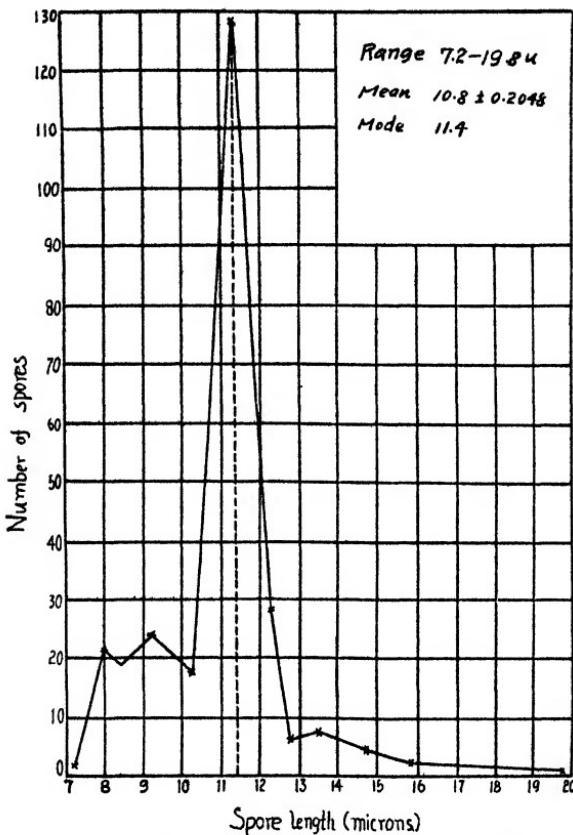


Fig. 1. Length of spore of *Botrytis cinerea* produced on diseased flowers.

in diameter with an average of about 2 mm.; while on potato-dextrose agar, they are 1.6 mm. in diameter with an average about 4 mm. They occur singly or aggregated into a cluster of considerable size.

Structually, the sclerotia are pseudoparenchymatous. They are composed of several layers of dark-walled parenchymatous cells, and the interior is a compact mass of long, slender, and thin-walled hyphal threads which are hyaline and richly protoplasmic. The shiny dark color of the sclerotium is due to the outer pseudoparenchymatous layers (pl. 23, fig. 4). Under favorable conditions, the sclerotia germinate either by sending out hyaline mycelial threads

or by direct production of conidiophores on their surface. In both cases, it is the interior hyphal threads which take the active part.

Physiology

The growth of the fungus in test tube cultures is at first spreading and superficial. Within two to three days, aerial hyphae begin to develop in the form of erect single strands either at the top or near the base of the agar slant. These are the conidiophores. On the conidiophores, clusters of spores are produced. The more densely the conidia are formed, the deeper the color of the culture will be. Finally they become dark smoky gray in color when the spore cultures are much crowded (pl. 22, fig. 3). At the same time, dark olive greenish appresoria are found in a state of aggregation on the walls of the tubes. Then, sclerotia begin to form at the edge of the culture. They are at first white or pale smoky green and gradually become darker in color until they are shiny black. Young flat sclerotia appear closely crowded on the surface of the medium while the old ones become wrinkled and greatly distorted.

The cultural characters were studied by growing the fungus on various kinds of media, and observing its growth. In general, the gross cultural characteristics of the fungus were not very different on the different media tried; while the rates of conidium and sclerotium formation showed some variation.

On Quaker oat agar slant, the conidium production was abundant both on the top and at the bottom of the slant. The growth at the middle of the tube was, however, very scanty. The substratum did not change its color. Sclerotia produced were fewer in number but larger in size. On potato-dextrose agar, the growth of the fungus was similar to that on the Quaker oat agar, except that in the former more sporulation and sclerotia were produced. On corn meal and rice decoction agars, the growth of the fungus did not differ essentially from that described in the above except that less sporulation took place; and the sclerotia and conidia were smaller in size but greater in number. Abundant sclerotia and conidia were produced on Czapeck's agar. The agar slant was completely covered by the dense gray-colored conidiophores. The cultural differences of the fungus when grown in various kinds of media are shown in plate 22, figure 3, and also given in table 1.

From this table, it is seen that Czapeck's agar is most favorable for both conidium and sclerotium production.

Temperature Relation

To study the influence of temperature on the growth of *Botrytis cinerea*, a series of Petri dishes containing 15 cc. of potato-dextrose agar each was inoculated at the center with a loopful of fresh spore suspension and placed in incubators giving a range of temperatures.

The diameters of the colonies were measured every 24 hours. The results of the experiment are shown in table 2 and also in figure 2.

TABLE 1
Cultural characters of Botrytis cinerea on different kinds of media

MEDIA	MYCELIAL GROWTH	SPORULATION	GREEN WT PER TUBE GR	NUMBER PER TUBE	SCLEROTIUM				SIZE	
					RANGE MM	MODE	MEAN	P.E. M	S.D.	
Czapeck's	++++	++++	0.6891	16.6	1-5	4	3.45	± 0.4376	1.6	
Potato-dextrose	++	+++	0.1953	9.5	1-5	3	2.95	± 0.8293	2.3	
Quaker oat	+++	+++	0.0446	2.7	2-5	3	2.74	± 0.7646	2.6	
Corn meal	+	+	0.0218	4.6	1-4	2	1.88	± 0.9371	1.9	
Rice decoction	+	+	0.0127	4.7	0.5-4	1	1.36	± 0.9764	2.0	

(+) indicates the abundance of growth and sporulations.

As seen in table 2 and in figure 2, the fungus made its growth in a wide range of temperatures. The growth was relatively

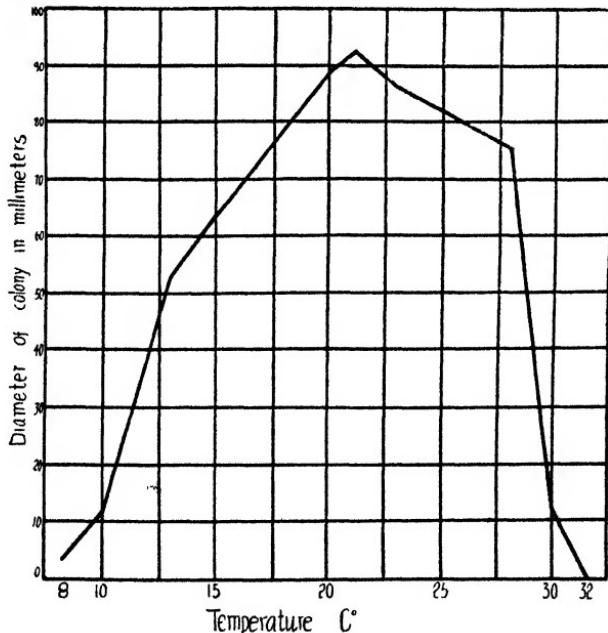


Fig. 2. Growth of *Botrytis cinerea* on potato-dextrose agar in Petri dishes. The curve represents the diameter of the colonies at the end of 5 days.

abundant at 13°C. but gradually increased at a higher temperature up to an optimum of 21°C. At 28°C., the growth was still favorable

since it was relatively thick, although colony diameter was smaller than at the optimum temperature. Above 28°C., the rate of growth was greatly retarded. No growth was seen at 35°C. When incubated more than 12 days, slight growth took place in the plates kept at 4° and at 32°C. At the end of 25 days, growth was seen to start as low as at 0°C. The maximum, optimum and minimum temperatures for the growth of the fungus were therefore about 4°, 20-25°, and 30-32°C., respectively.

TABLE 2
*Relation of temperature to the growth of *Botrytis cinerea*
on potato-dextrose agar*

TEM. PERATURE C°.	1	2	3	4	5	6	7
DAYS							
4.0-5.7	—	—	—	—	—	—	—
8.0-8.3	—	—	—	+	4.3	11.5	14.5
9.8-10.1	—	—	—	5.8	11.1	14.8	9.3
12.8-13.2	—	11.0	24.4	41.9	52.3	66.4	82.5
15.0-15.2	—	14.6	37.3	49.7	53.3	71.0	85.6
20.0-20.1	+	21.8	43.7	68.2	89.5	full	
21.1-21.7	+	24.7	48.7	75.5	92.1	do	
23.0-23.4	+	25.3	46.0	70.7	86.7	do	
24.8-25.0	+	21.4	42.6	64.2	82.6	do	
28.0-28.1	+	21.5	40.3	49.4	75.3	do	
30.0-30.3	—	+	5.7	11.3	12.1	12.7	13.4
32.0-32.5	—	—	—	—	—	—	—
37.0-37.2	—	—	—	—	—	—	—

(+) sign indicates a trace of growth.

Spore Germination

Germination of conidia took place also over a wide range of temperatures by the production of a germ tube from the apex or a short distance from the apex of the spore. In general, only one germ tube comes out at first. Sooner or later, a second one may arise from the apex of the other end or from any other point on the spore. As many as three tubes have been seen coming out from a single spore. The germ tubes are hyaline, finely granulate and measure from 3.8-8 μ in diameter. The place of emergence of the tube constricts but slightly. In many cases, the base of the germ tube became swollen into a vesicle-like body, sometimes they may be a little wider than the top portion. The tips of the tubes are slightly swollen or they may taper gradually towards the ends (pl. 23, fig. 1 b). Septa are laid

down without regard to the length of the tubes. Branches rise irregularly from the main tube when it attains a certain length. In the course of branching, small protrusions come out laterally from the main thread and finally develop into branches.

In distilled water at 24°C., the spores germinated in less than 24 hours. Even at 4°C., a considerable number of them germinated at the end of 4 to 5 days.

Temperature in Relation to Spore Germination

The influence of temperature on the germination of the spores was determined by the hanging drop method under various temperatures. The spore preparations were examined 24 hours after incubation. Those which did not germinate under either the low or high temperatures at the end of this period, were continuously incubated for further observations. The results are given in table 3.

TABLE 3
*Temperature in relation to the conidia germination of
Botrytis cinerea in 24 hours*

TEMPERATURE °C.	TOTAL NO. OF SPORES	NO. OF GERMINATING SPORES	PER CENT OF GERMINATION
5.0	400	0	0.0
10.0	400	13	3.3
13.7	400	364	89.3
21.4	400	391	97.7
23.0	400	282	89.1
25.6	400	381	95.3
27.8	400	367	91.8
29.5	200	153	76.5
35.0	200	0	0.0

From the above table, it is seen that the spores may germinate in a very wide range of temperature. The favorable temperature for the germination lies between 13.7° and 29.5°C. It seems, however, that a relatively low temperature favors spore germination. After three days of incubation, spores germinated at as low as 5°C. No germination, however, took place at 35°C. Spores which had been frozen in an ice box for one month still showed normal germination when they were kept under room temperatures.

Temperature in Relation to Spore Production

The plates incubated under different temperatures for the studies on the growth rate of the fungus were examined closely also for spore production. No sporulation was seen on the 4th day. On the 6th day spores were seen in the Petri dishes incubated at 21-21.7°, 23-23.4° and 24.8-25°C., respectively. On the following day cultures kept under either 20-20.1° or 28-28.1°C. showed sporulations. At 10°C., the

cultures sporulated only after a long period of time. At 1-4°C., in the ice box, the sporulation took place a month after inoculation. In fact, spore production took place in a wide range of temperatures with the optimum temperature at 21-23°C. This explains why sporulation of the fungus on the diseased plants in the greenhouse takes place almost throughout the year.

Longevity of Conidia under Desiccation

On account of the fact that the blossom blight of bean occurs in greenhouses where the diseased plants have been removed for a considerable length of time, it is thought that the spores may live very long under dry condition. Experiments were therefore made by placing drops of spore suspension in the center of cover glasses.

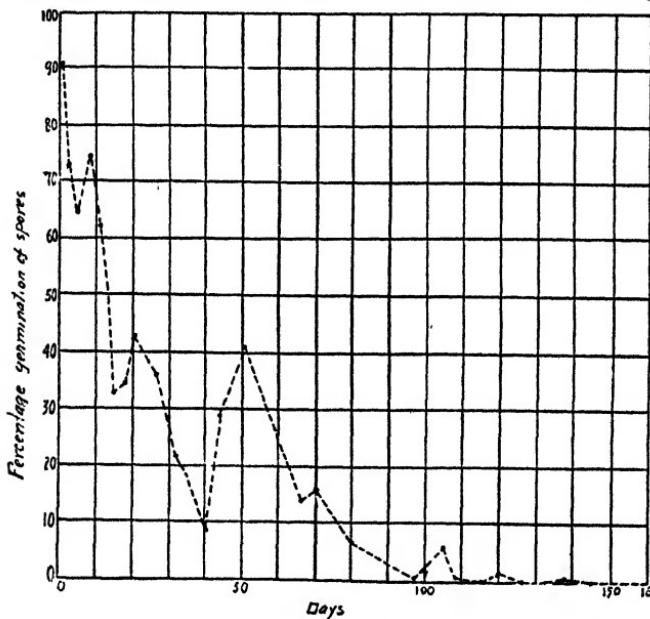


Fig. 3. Longevity of the spores under desiccation. The curve represents the per cent of germinating spores after different lengths of time.

After being dried, the glasses were kept in the laboratory and the spore germination was tested after varying lengths of time. The longevity of the spores under dry conditions is shown in figure 3. It is seen that the spores are very resistant to dry conditions. Many of the spores were viable even after a period of 138 days.

Inoculation Experiments

Inoculation tests were made by spraying conidial suspension on the broad bean plants which were then kept in the moist chamber for two days before setting on the greenhouse benches.

The first visible symptoms of the disease were seen 24 hours after inoculation as tiny dark brownish spots without definite margins. Under dry conditions, the spots seldom enlarged to a great extent, so that the inoculated plant grew normally in the greenhouse. When the atmosphere was humid, the spots or lesions extended rapidly and resulted in blackening and decay of the affected plant parts. In a severe case, the plants were completely blighted (pl. 22, fig. 1). Sporulations were usually found on the decayed plant parts as shown in plate 21, figures 1 to 6.

All the aerial parts of the plant and all stages of the plant development are subject to the attack of the fungus. However, the disease is destructive only under humid conditions, whereas the blight of the flowering parts makes the plant barren.

The Development of Blossom Blight under Greenhouse Conditions

The blossom blight of the broad bean described in this paper seldom occurs in the well ventilated greenhouse. Its development, according to the writer's observations, takes place only on the plants which are closely planted in a more or less damp place. The following experiment indicates that a high relative humidity in the air is essential for the development of the blossom blight of the bean plant: Plants 10 to 12 inches high, bearing numerous flowering buds, were sprayed with conidia suspensions of the fungus and incubated in glass chambers in which the relative humidity was controlled by sulphuric acid of various concentrations. On the cover of the chambers there were two holes through which thermometers with both the dry and wet bulbs could be inserted for direct readings. The chambers were set in the laboratory with the room temperature varying from 20 to 22.4°C. during the experiment. The results of this experiment are given in table 4

TABLE 4
*Relation of relative humidity to the development of Botrytis-blossom
 blight of broad bean*

TEMPERATURE OF WET BULB	DEVIATION FROM WET BULB	RANGE OF RELATIVE HUMIDITY	TOTAL NO. OF FLOWERING BUDS	NO. OF FLOWERING BUDS INFECTED	PER CENT INFEC-TION
21.0-21.2	0.0-0.2	89-100	87	87	100
20.9-21.4	0.21-0.	94-98	82	82	100
21.3-21.4	0.8-1.0	89-93	79	0	0
20.8-21.6	1.4-2.2	81-97	85	3	3.5
21.1-21.5	2.6-3.4	71-78	86	0	0
22.1-22.4	4.8-5.6	56-62	77	0	0

The experiment described above was discarded on the fourth day because the relative humidity in the chambers began to fluctuate. At the time, all the flowering buds of the plants kept under high humidity had produced black lesions, while the rest of them showed no symptoms. The experiment indicates that, within the limits of time used, an atmospheric humidity above 94 per cent is necessary for the development of the blight.

The Presence of *Botrytis cinerea* in Greenhouses

It was found that *Botrytis cinerea* occurs commonly on the blighted bean plants or on other kinds of plants in the greenhouse. Its presence was detected by catching the spores with opened Petri dishes containing sterile agars even when no visible sporulation had been seen on the plants. The plates, after being exposed for various lengths of time in the greenhouse, were brought back to the laboratory and incubated at 24°C. for 7 days. The presence of *Botrytis cinerea* can be easily detected by its characteristic conidium or sclerotium production. Results obtained from five greenhouses in which the blossom blight of bean has been observed in previous years, are given in table 5.

TABLE 5
Occurrence of *Botrytis cinerea* in greenhouses

GREEN HOUSE	CONDITIONS OF THE GREENHOUSE	TIME OF EXPOSURE		
		1 HR.	2 HRS.	3 HRS.
1	Well ventilated wheat	0*	0	0
2	Well ventilated broad bean	0	1	4
3	Poorly ventilated broad bean	7	7	9
4	Poorly ventilated vegetables	2	3	6
5	Well ventilated vegetables	0	0	1

* No. of plates showing growth of *Botrytis cinerea*.

On account of the spreading growth habit of the fungus, it is difficult to analyze quantitatively the number of spores that were caught on each plate by different lengths of exposure. However, it is very evident that more spores were present in the poorly ventilated than the well ventilated houses.

The prevalence of the blossom blight of bean in the greenhouse, as shown by the results of the various experiments described above, is therefore dependent on a high relative humidity in the air, the constant presence of the fungus in the house, and the longevity of the spore under dry conditions. Among these three factors, the first one is by far the most important as the disease seldom occurs in the well ventilated greenhouse in which the plants are not thickly sown.

Control

Experiments for controlling the blossom blight of broad bean were conducted in the greenhouse in the spring of 1935. Healthy plants bearing numerous flowering buds were set in the greenhouse. The buds were sprayed heavily with spore suspension. Eight hours after the inoculation, when the plants had dried, they were again sprayed with Bordeaux mixture (4-4-50) at the rate of 100 cc. per plant. Check plants were sprayed with 100 cc. of sterile distilled water. The experiments consisted of 50 each of the sprayed and non-sprayed plants. The doors and the windows of the greenhouse were closed tightly and a high relative humidity was maintained in it by constantly spraying water on the floor. The house was kept in a moist condition for three days. All the check plants developed blossom blight with various degrees of severity from three to five days after inoculation, while, at the same time, none of the plants sprayed with Bordeaux mixture contracted the disease. It was concluded at the end of the experiment that a single spray of Bordeaux mixture at the time of unfolding of the flowering buds controlled the disease effectively under glass. It should not be forgotten, however, that to keep the greenhouse well ventilated is also essential for controlling this disease.

Summary

1. A blossom blight of broad bean under glass is caused by a strain of *Botrytis cinerea* Pers. which differs from that described by Sardina in Spain by its readiness in producing an abundance of sclerotia in artificial culture media.
2. Under glass, it is mainly a disease of floral parts of the plants. The infected flowers and flowering buds become withered, black, and decayed. Under dry conditions, the fungus neither infects the vegetative parts of the plant nor passes from the infected flowers to the stems. But in the presence of an excessive moisture, blight of the tops as well as of the complete plants results.
3. The morphology, physiology and pathogenicity of the causal fungus have been discussed in detail.
4. A single spray of Bordeaux mixture (4-4-50) at the time of unfolding of the flowering buds completely eliminated the disease in the greenhouse.

Literature Cited

ANDERSON, J. P.

1924. *Botrytis cinerea* in Alaska. *Phytopath.* 14:152-155.

IDETA, A.

1926. Supplement to Handbook of the plant diseases of Japan II, p. 846-847, Shokwaba, Tokyo.

IKATA, S.

1933. Studies on Red Spot Disease (Chocolate spot disease) of *Vicia faba*. *Extra. Rept. No. 38, Okayamaken Agri. Expt. Sta.*, Okayamaken.

OGILVIE, L., AND MULLIGAN, O. B.

1930. Progress report on vegetable disease. *Ann. Rept. Agri. & Hort. Res. Sta. Long Ashton, Bristol for 1930*, p. 127-140.

SARDINA, J. R.

1931. Dos nue enfermedades de las Habas. *Bol. Path. Veg. Ent. Agri.* 5:19-22.

SAWADA, K.

1919. Descriptive catalogue of the Formosan Fungi. Part I. *Formosa Agri. Expt. Sta. Spec. Bull.* 19:599-603.

SHIRAI, M., AND HARA, K.

1919. A list of Japanese Fungi hitherto known. (3rd Edit.) 57 p.

WILSON, A. R.

1935. Relation of *Botrytis* spp. to Chocolate spot disease of bean (*Vicia faba*, L.). *Nature [London]* 136(3432) 226.

室 內 *Botrytis cinerea* Pers. 所 致 之
蚕 豆 花 器 枯 損 病

俞 大 紋 著

金陵大學植物病理研究室
(摘要)

蚕豆 (*Vicia faba* L.) 花器枯損病之原病菌乃 *Botrytis cinerea* Pers. 之一系。其與 *Sardina* 在西班牙所述不同者，因在培養基中，產菌核多且速也。在溫室內，考得此病，僅蚕豆花部感染而已，被害之花蕾與花，常呈枯萎，變黑色，及朽爛等現象。如環境乾燥，蚕豆枝葉，全不波及，病菌亦不由花器而傳害他部；苟環境潮濕，水氣過多，植物上部，則呈枯萎，甚至波及全株。本文對於此真菌之形態，生理，及病源等項，討論尤詳。在溫室內，以 4-4-50 之波以多液，於花未開放前噴射一次，則可防治此病。

Explanation of Plates**Plate 21**

- Fig. 1. The spread of disease from infected to healthy flowers by contact.
2. Blight of flowering buds.
3. Decay of calyx.
4. Decay of flowers.
5. Left, decayed flowers of a slimy texture; right, infected flowers with spots on the upper part of the petals.
6. Diseased flowers becoming soft and decayed and covered with copious sporulations.

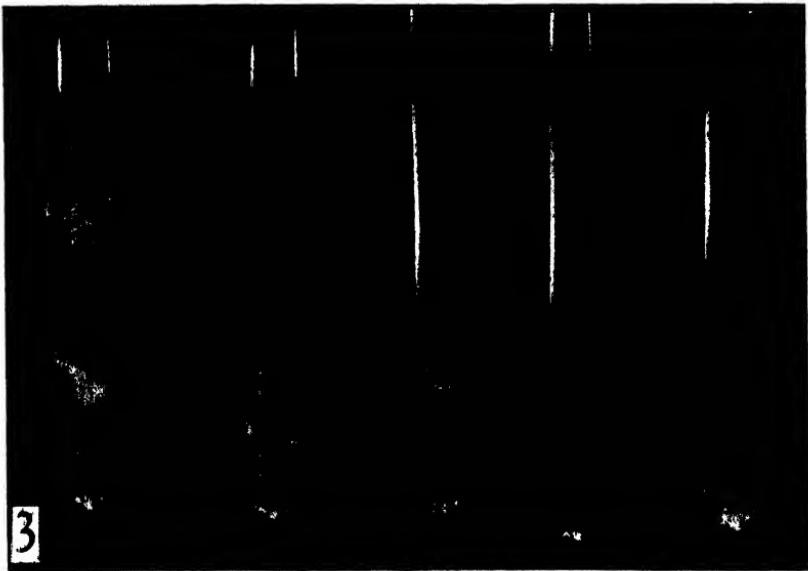
Plate 22

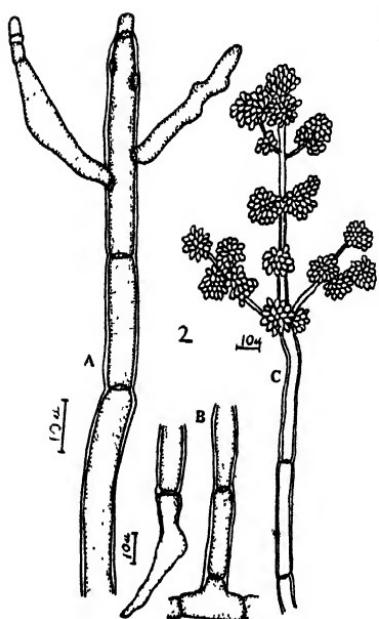
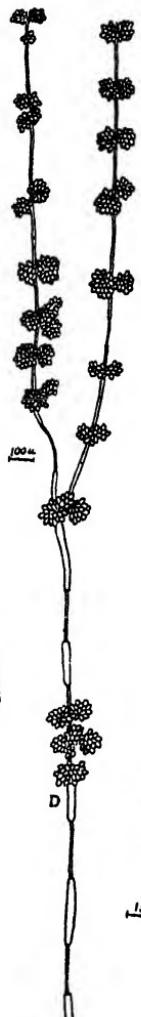
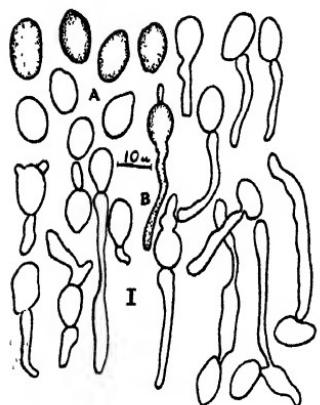
- Fig. 1. An artificially inoculated broad bean plant showing the blight of stem tips.
2. A 7-day-old potato-dextrose agar plate showing a copious conidia production.
3. Growth of *Botrytis cinerea* on various kinds of culture media. Note the differences in sporulation and sclerotium productions. From left to right: Czapeck's, potato-dextrose, Quaker oat meal, rice decoction, and corn meal agars.

Plate 23

- Fig. 1. a. Conidia of *Botrytis cinerea*.
b. Germinating conidia in distilled water, 24 hours at 24°C.
2. a. Tip of conidiophore.
b. The bases of conidiophores.
c. A portion of conidiophore with spores.
d. A conidiophore in potato-dextrose agar plate showing the branches and spore clusters.
3. Appresoria in potato-dextrose agar tubes.
4. A cross section of matured sclerotium showing the outer parenchymatous cells and the inner thin hyphal threads.







A NEW SPECIES OF BOOTTIA FROM HAINAN

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and

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Among the specimens in the H. Fung collection, Seventh Hainan Expedition, 1932, was a hydrochartaceous species that, on the basis of the single specimen in the study set, could not be placed satisfactorily. Recently, with several sheets of the original collection available, a more intensive study of the material shows that a species of *Boottia* is represented, and this apparently an undescribed one. If *Boottia* be retained as generically distinct from *Ottelia* this record adds a representative of another genus to the Hainan plant list.

From our own field work we realize that the broad-leaved aquatic plants are exceedingly variable, as is well represented by *Ottelia alismoides* (Linn.) Pers. Individuals working only with herbarium specimens and unfamiliar with certain species in the field have been misled by leaf size and shape into recognizing distinct species where manifestly the differences are merely responses on the part of the plant to a changed or changing environmental condition. Thus in this common and widely distributed *Ottelia*, plants growing in rather deep still water normally have very large, broadly ovate, elliptic-ovate or even suborbicular leaves; as pools dry up the leaves become smaller and smaller, and in very shallow water, when the plants are densely crowded, they may be reduced to but 2 or 3 inches in diameter, and often become more or less bullate. The same species as it occurs in moving water presents remarkable variations in leaf-shape, in slow streams the leaf being only slightly elongated, but in somewhat stronger currents the leaf becoming oblong, lanceolate, or even strap-shaped. The response in dwarfing as pools become shallow is a response to environment just as is the elongation of the leaves in moving water.

Although the *Boottia* described below is an aquatic, and these broad-leaved aquatics are notoriously variable, we have ventured to describe it as new for the reason that we have been unable to refer it to any named or described form. We realize that we may err, because plants described from only submerged leaves, may at times have floating ones which were not included in original descriptions because they were not available. Until a very large amount of

material has been assembled from a wide geographic range one always runs a chance of merely adding ultimately to synonymy in describing species in a group like this, for with a thorough revision of the group based on ample material doubtless many reductions will be the order of the day.

Boottia heterophylla sp. nov. (pl. 24, 25)

Herba acaulis, foliis submersis lanceolatis, membranaceis, utrinque angustatis acutisque, 25-40 cm. longis, 2-7 cm. latis, 5-9-nerviis, haud trabeculatis, irregulariter reticulatis, petiolo usque ad 25 cm. longo; foliis natantibus oblongis vel oblongo-ovatis, acutis vel obtusis, basi late rotundatis, perspicue cordatis, 15-20 cm. longis, 6-9 cm. latis, quam foliis submersis crassioribus, longitudinaliter 9-nerviis, petiolo usque ad 30 cm. longo; spathis ♂ oblongo-ovoideis, 4-4.5 cm. longis, exalatis, junioribus extus glabris, vetustioribus sursum distinetè minuteque aculeatis, lobis acuminatis, circiter 3 mm. longis; floribus ♂ circiter 15, seriatim uno tempore 1-4 erumpentibus, pedicellus sub anthesin circiter 6 cm. longis; sepalis oblongis, 1.5 cm. longis, 4-5 mm. latis, obtusis; petalis obovatis, rotundatis, usque ad 3 cm. longis, albidis; staminibus 12, antheris linearis, 4 mm. longis; floribus ♂ fructibusque ignotis.

HAINAN: Wen Ch-ang District, Tung Koo Shan, near Shan Hoi village, *H. Fung* 2044, August 3-25, 1932, submerged in shallow ponds.

A species manifestly allied to *Boottia cordata* Wall. but with rather long-petioled, not sessile, submerged leaves and much smaller, smooth or only slightly aculeate spathes. Neither have we been able to refer it to either of the three species credited by Gagnepain to Indo-China, nor to the several Chinese species described by him in *Boottia*, *Oligolobos*, and *Xystrolobos*. As these genera are defined this Hainan species manifestly belongs in *Boottia*. However, Dandy, *Jour. Bot.* 72: 132-139, 1934, in a review of the genera of this group, has reduced the various species of *Boottia*, *Oligolobos* and *Xystrolobos* to *Ottelia*, recognizing three subgenera, *Boottia*, *Dipteron*, and *Otteliastrum*. We hesitate to place in *Ottelia*, typically characterized by solitary perfect flowers, those species in which there are several to many flowers in a single spathe and in which the plants are dioecious. Admittedly the entire family is in need of a critical revision, but such a revision, based mostly on dried material, presents numerous difficulties.

The two plates have been drawn by Jose Gomez, the dissections of the flower were prepared by Leung, Bing-Sing, Botany Assistant.

海南之一新種 *Boottia*

美國哈佛大學各植物採集所總監理 E. D. Merrill
嶺南大學自然博物採集所植物標本室主任 麥克福 合著

(摘要)

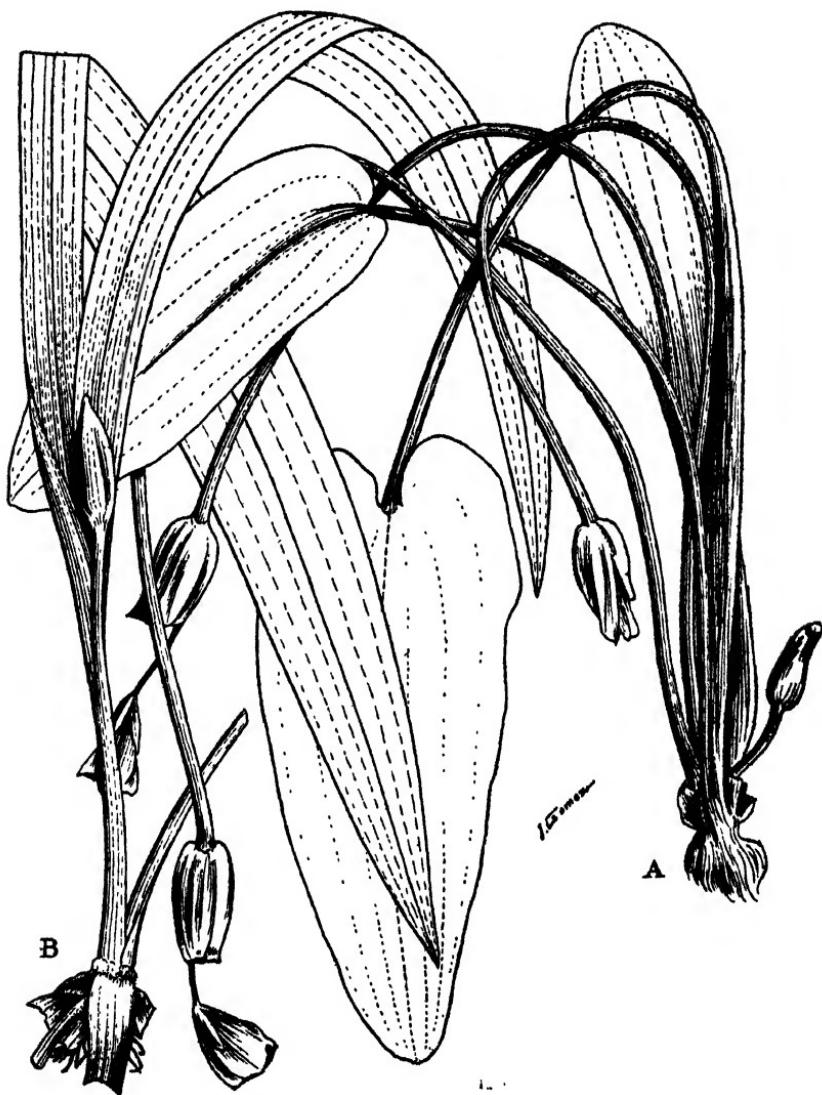
本文所敘述之新種 *Boottia heterophylla* n. sp. 為一種闊葉之水生植物，由海南文昌縣之銅鼓山上所探得；係根據馮欽君第 20444 號于民國廿一年八月三日至廿五日探諸淺水之池塘間者。該種與 *Boottia cordata* Wall. 相似，惟其葉之浸於水中者有甚長之葉柄，又其花苞甚小，光滑，或稍有鋸齒。

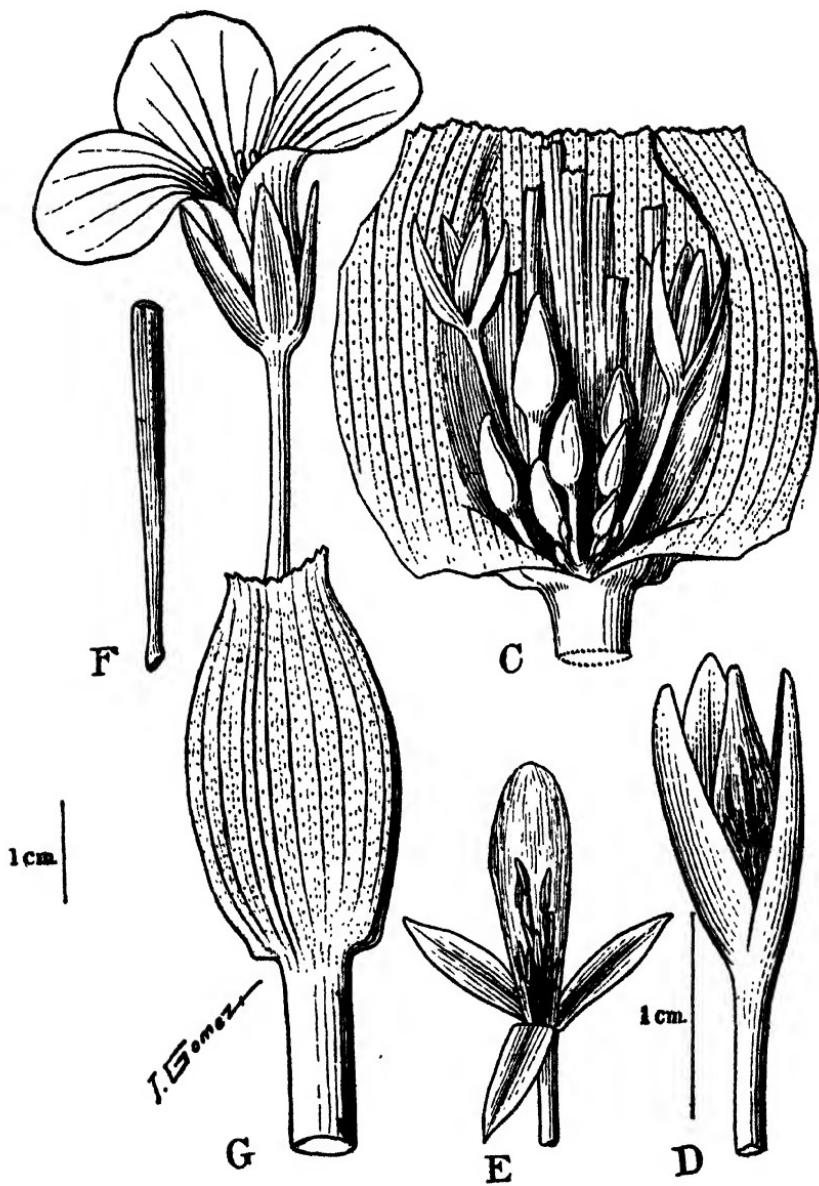
Explanation of Plates

Boottia heterophylla Merrill and Metcalf, sp. nov.

Fung Hom 20444, Tung Koo Shan, Hainan.

- A. Entire plant with floating cordate leaves, about $\frac{1}{2}$, natural size.
- B. Entire plant with submerged leaves, about $\frac{2}{3}$, natural size.
- C. Spatha with numerous flowers of different ages and sterile bracts.
- D. Single young ♂ flower.
- E. Somewhat older ♂ flower with petals folded into a obconic tube, not yet unfolded, showing the 12 stamens inside.
- F. Sterile bracts ?
- G. Older flower, open with spathe.





**TORTOISE BEETLES IN THE COLLECTION OF THE LINGNAN
NATURAL HISTORY SURVEY AND MUSEUM (COLEOPTERA:
CHYSOMELIDAE: CASSIDINAE)¹**

By J. LINSLEY GRESSITT

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and Museum, Lingnan University.*

This report is based entirely on the Tortoise Beetles, or cassidids, in the collection of the Lingnan Natural History Survey and Museum of Lingnan University, Canton. The collection contains about six hundred and forty specimens of thirty-two species, of which one species is herein described as new to science. Keys are given to the genera, and to the species within each genus, as an aid to the identification of the species from the regions dealt with. Twenty of the species were collected on Hainan Island, sixteen are from mainland Kwangtung Province, south China, four from Tongking (northern Indo-China), three from Fukien, three from Kwangsi, four from Hunan, two from Kiangsi, and one from Hupeh Province, south China, and two species were collected on Hong Kong Island, off Kwangtung. The specimens were collected under the supervision of Prof. William E. Hoffmann, the collectors being F. K. To, William E. Hoffmann, O. K. Lau, D. C. Ngu, E. R. Tinkham, Y. W. Djou, Chauncey W. Brownell, Betty Bercovitz, and others. I am indebted to Professor Hoffmann, Director of the Lingnan Natural History Survey and Museum, for the privilege of making this study. The specimens, including the type of the new species, are to be deposited in the Lingnan Natural History Museum, with duplicates in the collection of the writer and in the California Academy of Sciences.

The writer has recently published reports on his own collections from Hainan Island² and from southeastern China³. Most of the species discussed in those papers are contained in the present collections. One of the writer's species lacking in the Lingnan collections is included in the key to species of the genus *Prioptera*.

* **Key to Genera**

- A. Head not entirely concealed from above by pronotum; anterior margin of pronotum emarginate B.
- Head completely covered by pronotum, which latter has a convex anterior margin E.

¹ Contribution from Lingnan Natural History Survey and Museum.

² See Gressitt, J. L.: Some Tortoise Beetles from Hainan Island. *Ling. Sci. Jour.* 17(2) :185-193, 1938.

³ See Gressitt, J. L.: Some Tortoise Beetles from Southeastern China. *Ling. Sci. Jour.* 17(3) :383-388, 1938.

- B. Vertex not produced; elytral margins narrow at bases; pronotum grooved laterally C.
- Vertex strongly produced into a forward projecting plate above antennal insertions; pronotum very broad, lacking submarginal grooves *Hoplionota* Hope
- C. Pronotal and elytral margins narrowly expanded; anterior margin of pronotum feebly emarginate; elytra metallic or partly so, deeply and subseriatly punctured D.
- Pronotal and elytral margins broadly expanded; anterior margin of pronotum deeply and arcuately emarginate; elytra non metallic, shallowly and irregularly punctured *Prioptera* Hope
- D. Pronotum grooved medially and nearly impunctate, its anterior margin obtusely emarginate; elytra entirely metallic, iridescent *Calopepla* Hope
- Pronotum coarsely punctured, not grooved medially, its anterior margin broadly and transversely emarginate; elytra only partially metallic *Epistictia* Boheman
- E. Claws with a comb-like structure at the base of each F.
- Claws lacking basal comb-like structures G.
- F. Body rounded in outline; elytra fairly smooth, with broad, subhorizontal lateral expansions *Aspidomorpha* Hope
- Body somewhat triangular in outline; elytra rugulose and deeply punctured, with moderately broad, declivitous lateral expansions *Laccoptera* Boheman
- G. Sides of prosternum lacking grooves for reception of antennae H.
- Sides of prosternum each with a groove for reception of an antenna; form of body rounded-oval, strongly and evenly convex *Chirida* Chapuis
- H. Form more or less triangular, with humeral angles prominent; a distinctly raised area on suture behind scutellum I.
- Form oval or rounded-oval; humeral angles not very prominent; no very prominently raised area on suture behind scutellum J.
- I. Antennae reaching well beyond humeral angles; a fringe of fine hairs extending obliquely downward from underside of apical margins of elytra; explanate margins of pronotum and elytra smooth *Thiaspida* Weise
- Antennae barely reaching beyond humeral angles; no apical fringe of fine hairs present on elytra; explanate margins of pronotum and elytra coarsely rugulose or foveate-punctate *Deloyala* Redtenbacher
- J. Antennae reaching beyond middle of metasternum; apical segments rarely thickened Metriona Weise
- Antennae not reaching as far as middle of metasternum; apical segments generally thickened *Cassida* Linnaeus

Tribe Priopterini

Genus *Hoplionota* Hope, 1840

Key to Species

- Projections at vertex of head narrowed and subacutely rounded anteriorly; explanate margins of pronotum and elytra largely pitchy black, a rounded translucent spot, impunctate internally, on each side near middle *fumida* Spaeth
- Projections at vertex of head broadened and transversely truncated anteriorly; explanate margins ochraceous to light pitchy red, entirely punctured *oblongopunctata* n. sp.

1. Hoplionota fumida Spaeth

Hoplionota fumida Spaeth, 1918, Verhandl. zool.-bot. ges. Wien 63:513
(China; Bowring collector; type in British Museum).

Eighty specimens were collected in Lien and Yang-shan Districts, in N. Kwangtung Province, S. China, in 1934 by F. K. To: three at Taam-yuen-tung, Lien Dist., May 29-June 19; thirty-three at lu-ling-paai, Yao Shan, Lien Dist., Sept. 27-Oct. 10; and forty-four at Naam-kong-paai, Yao Shan, Yang-shan Dist., Oct. 16-Nov. 8.

Rounded-oblong, nearly as broad as long; pitchy black to reddish-brown above, with margins narrowly ochraceous and a large pale yellow translucent spot at each side before middle of elytra; ventral surfaces pitchy with abdomen and legs dull testaceous. Cephalic process narrowed apically, deeply and narrowly emarginate; pronotum impressed with elongate punctures at sides, convex and sparsely punctured in middle; scutellum broad, rounded posteriorly; elytra finely and not very irregularly punctured on disks, with inner costa incomplete, feebly raised at three points, with four ridges radiating from third tubercle, explanate margins more strongly punctured, but impunctate on inner halves of translucent areas. Length 5.4-6.5 mm.; breadth 4.8-5.4 mm.

2. Hoplionota oblongopunctata n. sp.

Body rounded-oblong in form, a little more than three-fourths as broad as long. Color pitchy red-brown mixed with blackish on pronotal and elytra disks; explanate margins yellowish-testaceous, tinged with reddish on sides of pronotal expansions and on elytra in posterio-lateral regions; ventral surfaces and legs slightly reddish-testaceous, a little duller on metasternum; antennae ochraceous; eyes black.

Head flattened, produced anteriorly, anterior projection truncate apically, broader at apex than at base, narrowly and briefly emarginate at middle, not extending as far anteriorly as margins of pronotal expansions, somewhat concave and grooved between eyes; frons plane and smooth, nearly twice as long as broad, and almost parallel-sided. Antennae reaching about four-fifths distance to lateral extremities of pronotal expansions; first and second segments subcylindrical, thicker than third to sixth segments, which are each slightly thickened apically; seventh greatly broadened apically and eighth to eleventh still broader and somewhat compressed, eighth to tenth each about twice as broad as long. Pronotum practically as broad as elytra at base, rather evenly rounded from anterior emargination (which is nearly V-shaped) to posterio-lateral angles; basal margin with widely spaced serrations, anterior margin with close, but less distinct, ones; disk moderately smooth, with three radiating convex areas, comprising about one-third tergal area:

explanate margins nearly horizontal, deeply impressed with large transversely or obliquely placed oblong punctures, some smaller rounded ones in a row near margins. Scutellum broader than long, rounded posteriorly. Elytra as broad as long, broadly rounded posteriorly, hardly expanded at sides; disks not very deeply punctured, subseriatel so only at sides, inner costa prominent, but interrupted at intervals, behind middle a lateral branch extends obliquely toward external margin, and behind it another diverges, extending antero-obliquely a short distance towards suture; second costa represented by three short raised lines; explanate margins feebly declivitous laterally, nearly horizontal apically, deeply impressed with subseriate rows of oblong punctures, a regular row of smaller and more closely placed punctures parallel to external margins. Ventral surfaces practically impunctate Length 4.2-4.4 mm.; breadth 3.1-3.3 mm.

Holotype (Lingnan Nat. Hist. Surv. & Museum), Sam-ah-kong, Yai District, southern Hainan Island, South China Sea, January 24-26, 1935, F. K. To, collector; paratype (Gressitt collection), same data.

Similar to *H. sauteri* Spaeth, of Formosa, but it is much more rectangular than the latter and has the pronotum practically as broad as the elytra, the explanate margins are more distinctly punctured, and the posterior carina of each elytral disk continues anteriorly from the point where the lateral branch leaves it. Differs from *H. circumdata* Wagener in being less rounded and more rectangular, in having the apical four segments of the antennae broader and more compressed, the pronotum as broad as elytral bases, extending farther anteriorly than cephalic process, and with the explanate margins with much larger, oblong punctures, the inner elytral costa with two branches behind middle, the diskal tubercles fewer in number, etc.

Genus *Calopepla* Hope, 1840

3 *Calopepla leayana insulana* Gressitt

Calopepla leayana insulana Gressitt, 1938, Ling. Sci. Jour. 17 (2) : 187
(central and western Hainan Island)

Thirty specimens in the Lingnan Natural History Survey and Museum were taken at the following localities on Hainan Island in 1935 by F. K. To: Cheung-kon-ts'uen, Ka-luk-kong (18 mi. E. of Nam-fung), Kiung-shan Dist., Apr. 13-14; Tai-pin-ts'uen (Dwa Bi), Lam-ka-heung, Lai-mo-ling (Loi Mother Mt.), Kiung-shan Dist., May 8-31 and June 25; Tai-tsing-lam-ts'uen, back of Lai-mo-ling, Ting-an Dist., June 17-18.

Elytra shiny metallic green or bluish-green; body dull testaceous; apical portions of antennae black. Length 11-14 mm.; breadth 7-8.2 mm.

Genus **Prioptera** Hope, 1840

Key to Species

- A. Elytral disks immaculate or with only a small dark spot on each, posteriorly near suture; metasternum almost entirely testaceous; pronotum immaculate B.
- Elytral disks either largely black along central portion or with three small spots on each: one near scutellum, one behind humerus, and one near suture behind middle, in which case there is a pair of round black spots on pronotal disk; metasternum crossed by a broad black band C.
- B. Elytral disks unmaculate; form of body nearly round in outline, broadest anterior to middle; metasternum with a small dark spot on each side near posterior margin *bimaculata* (Thunberg)
A small black spot near suture in apical third of elytra; body ovate in outline, broadest posterior to middle; metasternum entirely testaceous. *maculipennis reducta* Gressitt
- C. Elytral disks each with three small black spots besides postero-lateral spots; pronotum with a round black spot on either side of center of disk; punctures at center of elytral disks mostly larger than spaces between them (*multipunctata* Gressitt)
Elytral disks each with a large spot occupying most of area, and a relatively large postero-lateral black spot on each explanate margin; pronotum immaculate or with a vague pitchy brown spot on each side of disk; punctures at center of elytral disks much smaller in diameter than spaces between them *whitei trabeata* Fairmaire
4. **Prioptera bimaculata** (Thunberg)
Cassida bimaculata Thunberg, 1789, Nov. Ins. Spec. 5 : 86, pl. 5, fig. 93 (China).
Prioptera bimaculata Bohemian, 1850, Mon. Cassid. 1 : 52.
Two males and two females, including a pair in copula, were taken at Linchow, Lien Dist., N. Kwangtung Prov., on August 9, 1934, by F. K. To.
Largely testaceous, with a yellowish-brown tinge on ventral surfaces and margins and middle of sides of explanate margins; a rounded postero-lateral black spot on each side; antennae ochraceous brown with apical two segments blackish; a small pitchy spot on each side of metasternum near posterior margin, top of head marked with pitchy posteriorly; explanate margins of elytra very broad anteriorly in male, moderately broad in female; pronotum impunctate; elytral disks finely and irregularly punctured. Length 14-15 mm.; breadth 11-12.6 mm.

5. **Prioptera maculipennis reducta** Gressitt

Prioptera maculipennis reducta Gressitt, Ling. Sci. Jour. 17 (2) : 185 (Ta Hian and Ta Hau, Hainan Island)

Five specimens, two males and three females, were collected on Hainan Island by F. K. To: one at Faan-no, 9 mi. S. of Nodoa, Tan Dist., July 10-11, 1932; one at Nai-suen, 21 mi. SE. of Nam-fung, Lin-kao Dist., Sept. 10-12, 1932; one at Tai-pin-ts'uen (Dwa Bi),

* See Gressitt, J. L. : Ling. Sci. Jour. 17(2) :186, 1936

Lam-ka-heung, Lai-mo-ling (Loi Mother Mt.), Kiung-shan Dist., May 10-11, 1935; and two between Cheung-kon-ts'uen and Tai-pin-ts'uen, Kiung-shan Dist., July 19, 1935.

Largely ochraceous on dorsal surfaces, paler on explanate margins, a large, squarish black spot on disk of each in a line with posterior margins of posterio-lateral spots; antennae dull ochraceous with penultimate segment and all but apical portion of last segment blackish; ventral surfaces dull testaceous. Length 10.5-11 mm.; breadth 8-8.5 mm.

6. *Prioptera whitei trabeata* (Fairmaire)

Prioptera trabeata Fairmaire, 1888, Ann. Soc. Ent. Belg. 32 : 46 (Kiangsi Prov.).

Prioptera whitei ab. *trabeata* Spaeth, 1914, Col. Cat. 62 : 19.

Thirty-six specimens were collected in Kwangtung, Fukien and Hunan Provinces, S. China, as follows: five at Cha-po-hui, Kien-yen Dist., Fukien, May 10-18, 1933, D. C. Ngu; one at Siu-kwong Village, July 23-25, and two at Tai-kwong Village, Lam-mo Dist., Hunan, July 26-28, 1934, F. K. To; eight at Taam-yuen-tung, Lien Dist., N. Kwangtung, May 29-June 3, 1934, F. K. To; one at Fong-tong-ping, Hoh-kai-hon, Lien Dist., July 4-5, 1934, F. K. To; twelve at Keung-tin-heung, July 8-17, one at Tu-ling-paai, Yao-shan, Oct. 1-2, and one at Naam-kong-paai, Yao-shan, Lien Dist., 1934, F. K. To; three at Yam-na Shan (Yim-na San), 15 mi. ESE. of Pin-chuen, Mei Dist., E. Kwangtung, Aug. 24-28 and Sept. 13-18, 1933, F. K. To; and one at Tsing-leung Shan (Tsin-leong San), 12 mi. S. of Sai-yeung, Mei Dist., Sept. 25-30, 1933, F. K. To.

Ochraceous, with explanate margins of elytra testaceous except at borders; elytral disks each with a large black area occupying most of surface, but not touching margins; explanate margins with a large rounded or oblong black spot at posterio-lateral angles; pronotum sometimes with an ill-defined pitchy brown spot on each side of disk; antennae dull ochraceous with last two segments pitchy black; ventral surfaces ochraceous with a black band across metasternum; elytra finely punctured on disks. Length 8.7-10 mm., breadth 7.4-8.6 mm.

Genus *Epistictia* Boheman, 1850

7. *Epistictia viridimacula* Boheman, subsp. ?

Epistictia viridimacula Boheman, 1850, Mon. Cassid. 1 : 15 (Nepal).

Epistictia Parigi Baly, 1863, Jour. Ent. 2 : 8 (Assam).

Epistictia perplexa Baly, 1863, Jour. Ent. 2 : 7 (Laos).

Epistictia marginata Kirsch, 1875, Mitt. zool. Mus. Dresden 1 : 56 (Malacca).

Two specimens were collected by Ernest R. Tinkham: one in mountains 5 mi. S. of Lung-chow, Lung-cheu Dist., Kwangsi Prov., S. China, Aug. 8, 1934, the other at Laokay, WNW. Tongking, French Indo-China, Aug. 12-13, 1934. New to China.

Bright reddish-brown; pronotum with a pair, and elytra each with nine, more or less rounded metallic greenish-black diskal spots; lateral margins of pronotum, and legs, ochraceous; ventral surfaces orange-red; antennae black except for first two to four segments which are reddish-brown. Pronotum and elytra densely punctured, the latter more coarsely so and in part subseriatel; ventral surfaces practically impunctate. Length 6.8-7.5 mm.; breadth 4.8-5.2 mm.

Tribe **Aspidomorphini**

Genus **Aspidomorpha** Hope, 1840

Key to Species

- A Elytral disks with a common, subacute tubercle at suture a short distance behind scutellum B.
- Elytral disks evenly convex and smooth, lacking a postbasal tubercle... .
..... *miliaris* (Fabricius)
- B At least anterior angles of explanate margins of elytra with pigmented patches extending to lateral borders C.
- Neither anterior nor posterior lateral angles of explanate margins of elytra with dark patches reaching to lateral borders; body rounded; last two antennal segments black *fuscopunctata* Boheman
- C Size large; at least 10 mm. in length of body D.
- Size small; under 8 mm. in length of body E.
- D Form rounded; posterio-lateral angles of explanate margins of elytra with at least partial pigmented patches; elytral disks irregular.....
..... *sanctae-crucis* (Fabricius)
Form subtriangular, broadest near anterior angles of explanate margins; posterio-lateral angles of explanate margins with pigmented areas; elytral disks fairly even behind middle *dorsata* (Fabricius)
- E Explanate margins of elytra deeply pigmented along suture at apex; last two antennal segments black *chandrika* Maulik
Explanate margins of elytra not pigmented along suture at apex; last two antennal segments only slightly pigmented *furcata* (Thunberg)

8. Aspidomorpha chandrika Maulik

Aspidomorpha chandrika Maulik, 1918, Ann. & Mag. Nat. Hist., ser. 9,
1 : 322 (Darjeeling).

Two specimens were collected on Hainan Island in 1935 by F. K. To: one at Tai-ping-ts'u'en, Lam-ka-heung, Lai-mo-ling (Loi Mother Mt.), Kiung-shan Dist., May 19-20, the other at Sam-ts'u'en-kai-hui, SE. of Lai-mo-ling, Ting-an Dist., July 4-6. New to Hainan Island and to China.

Small, slightly narrowed posteriorly; humeral angles somewhat prominent. Explanate margins pale testaceous and transparent, with a narrow humeral patch of dark reddish-brown at base of each elytron; pronotal disk pale ochraceous; elytral disks dark brown with splotches of lighter brown; ventral surfaces and antennae testaceous, with last two segments of latter black. Length 7 mm.; breadth 5.8 mm.

9. Aspidomorpha dorsata (Fabricius)

Cassida dorsata Fabr., 1787, Mant. Ins. 1: 64 (Siam).

Aspidomorpha dorsata Boheman, 1854, Mon. Cassid. 2: 296.

Aspidomorpha calligera Boheman, 1854, Mon. Cassid. 2: 297.

Three specimens were collected on Hainan Island: one at Kachek, Kiung-shan Dist., May 13-16, 1932, F. K. To; one at Nam-fung, 10 mi. S. of Nodoa, Tan Dist., July 1, 1932, O. K. Lau and F. K. To; and the third at Cheung-kon-ts'uen, Ka-luk-kong (18 mi. E. of Nam-fung), Kiung-shan Dist., Apr. 11-12, 1935, F. K. To.

Moderately large, distinctly narrowed posteriorly, and with prominent humeral angles of explanate margins of elytra; pronotum impunctate; elytral disks each with ten rows of fine punctures. Explanate margins pale amber colored, subtransparent, those of elytra with bases reddish-brown; pronotal disk and scutellum pale yellowish-testaceous, elytral disks reddish-brown marked with yellowish-testaceous on tubercle; sides of humeri and middle of lateral portion of disk Length 9.5-11.5 mm.; breadth 8.7-10.5 mm.

10. Aspidomorpha furcata (Thunberg)

Cassida furcata Thunberg, 1789, Nov. Ins. Spec. 5: 87, pl. 5, fig. 96 (Siam).

Cassida dorsata Olivier (not of Fabricius), 1790, Enc. Meth. 5: 386 (Java).

Cassida micans Fabricius, 1801, Syst. Eleuth. 1: 396 (Sumatra).

Aspidomorpha furcata Maulik, 1919, Faun. Brit. India, Col. Chrysom. (Hisp. and Cassid.) 333

Sixty three examples were collected on Hainan and Hong Kong Islands and in mainland Kwangtung as follows: one in N. Hainan, 1932, by Betty Berecovitz; two at Hoihow, N. Hainan, Apr. 1932, F. K. To; three at Hoihow, Aug. 1932, W. E. Hoffmann; two at Kachek, K'iung-tung Dist., E. Hainan, May 13-16, 1932, F. K. To; one at Nam-ting-ts'uen, 10 mi. NE. of Sam-ab-kong, Yai Dist., S. Hainan, Feb. 8-9, 1935, F. K. To; two in Kom-yan city and vicinity, Kan-en Dist., Mar. 9, 1935, F. K. To; three at Lok-kei, 9 mi. NNW. of Nodoa, Tan Dist., June 20-21, 1932, O. K. Lau and F. K. To; one at Nodoa, Aug. 1-26, 1935, one en route Nodoa to Nam-fung, June 23, 1932, O. K. Lau and F. K. To, six at Nam-fung, June 24 and July 6, 1932, O. K. Lau and F. K. To, and Mar. 23-25, 1935, F. K. To; four at Cheung-kong-ts'uen, 18 mi. E. of Nam-fung, Apr. 11-14 and July 17-18, 1935, F. K. To; two en route Cheung-kon-ts'uen to Tai-pin-ts'uen, Kiung-shan Dist., July 10, 1935, F. K. To; five at Tai-pin-ts'uen, near Loi Mother Mt., May 5-7, 15-16 and July 24-25, one at Tai-tsing-lam-ts'uen, back of Loi Mother Mt., June 22, and one at Nam-liu-ting, Lam-wan-tung, Kiung-shan Dist., Hainan, July 26, 1935, F. K. To. Nine were collected on Hong Kong Island: four in Aug. 1933 by W. E. Hoffmann and five on Aug. 6, 1934 by Y. W. Djou. Ten were taken on Honam I., Canton, Kwangtung: six by Prof. Hoffmann, Dec. 1, 1932, Mar. 1, 1933, June 21 and July 13, 1933 and spring 1936; one July 8, 1932, Y. W. Djou; one July

28, 1932, H. Chung; and one May 30, 1933, T. Y. Chue. One at Ts'in-pai, Siu-i Dist., July 9, 1932, W. E. Hoffmann; one at San-po-hui, Mei Dist., E. Kwangtung, Aug. 7-9, 1933, one at Yam-na Shan, Mei Dist., Sept. 6-11, 1933, three at Yao Shan, Apr. 24-26 and May 6-8, and one at Sheung-shui-heung, Sept. 7-8, Lien Dist., 1934, F. K. To; and one at Tung-chung, Lantau Island, near Hong Kong, Aug. 16-19, 1934, Y. W. Djou.

Relatively small, nearly round in outline; humeral angles slightly prominent; antennae strongly thickened towards apices; dorsal tubercle on elytra low and blunt; antennae testaceous with last segment pitchy: explanate margins very pale testaceous, subtransparent, basal portion of those of elytra reddish or dark brown; pronotal disk yellowish-testaceous; elytral disks light to dark reddish-brown, paler on front of dorsal tubercle and at middle of each side; ventral surfaces of body testaceous. Length 6.6-8 mm.; breadth 5.5-7 mm.

11. *Aspidomorpha fuscopunctata* Boheman

Aspidomorpha fuscopunctata Boheman, 1854, Mon. Cassid. 2 : 298 ("India").

Two specimens were collected: one in the Five Finger Mts., Ting-an Dist., S. central Hainan, Apr. 25-27, 1932, W. E. Hoffmann, the other at Naam-kong-paai, Yao Shan, Yang-shan Dist., N. Kwangtung Prov., Oct. 23-26, 1934, F. K. To.

Subrounded in outline, slightly narrowed posteriorly; pronotum impunctate, but with a basal depression opposite scutellum; elytral disks finely and sparsely punctured. Explanate margins almost entirely pale and subtransparent, basal reddish portions on elytra not reaching external margins; pronotal and elytral disks reddish-testaceous to pale yellowish-brown, more reddish laterally, in particular along puncture-rows. Length 9-9.4 mm.; breadth 6.2-6.5 mm.

12. *Aspidomorpha miliaris* (Fabricius)

Cassida miliaris Fabr., 1776, Syst. Ent. . 91.

Aspidomorpha miliaris Boheman, 1854, Mon. Cassid. 2 : 261.

Thirty-nine specimens were collected on Hainan Island as follows: twenty-four at Hoihow, N. Hainan, four in Apr. 1932, F. K. To, two on May 9, 1932, W. E. Hoffmann and O. K. Lau, eight in June, and six in August, 1932, one "1932", W. E. Hoffmann, and one in July, 1932, Betty Bercovitz; one at Nam-liu-tin, Lam-wan-tung, Aug. 2-4, 1935, F. K. To; one at Tai-pin-ts'uen, Lai-mo-ling, May 21-22, 1935, F. K. To; one at Kaekek, May 3-6, 1932, W. E. Hoffmann; one at Hau-ying-ts'uen, 6 mi. SE. of Nodoa, Aug. 4-6, and one at Hai-suen, 21 mi. SE. of Nam-fung, Aug. 31, 1932, F. K. To; one at Lin-fa Shan, alt. 2,000 ft., 6 mi. SE. of Nodoa, June 9, 1932, O. K. Lau and F. K. To; one between Lok-kei and Nodoa,

June 18-21, and four at Nam-fung, 10 mi. SSW. of Nodoa, June 23, 25, 30, and July 6, 1932, O. K. Lau and F. K. To; and one at Yau-ma-woh, 3 mi. SW. of Nodoa, near foot of Sha-po-ling, July 8-9, 1932, F. K. To.

Large, nearly round in outline, explanate margins of elytra very broad before middle; dorsal tubercle of elytra lacking. Color variable: pale testaceous to dark pitchy red, with several black spots on disk of each elytron and extreme basal, posthumeral, posterolateral, and apico-sutural, black bars or explanate margins; apical three, or in dark phase all, antennal segments blackish; ventral surfaces with metasternum and basal portions of abdominal segments, except at sides, always black and remaining portions either testaceous or blackish Length 10-13.5 mm.; breadth 9.5-11.3 mm.

13. *Aspidomorpha sanctae-crucis* (Fabricius)

Cassida sanctae-crucis Fabricius, 1792, Ent. Syst. 4 : 446.

Aspidomorpha sanctae-crucis, Boheman, 1854, Mon. Cassid. 2 : 287, pl. 6, fig. B.

Aspidomorpha bajula Boheman, 1854, Mon. Cassid. 2 : 288.

Thirty-four examples were taken on Hainan Island and on the Kwangtung mainland, as follows: Hainan—two at Cheung-kon-ts'uen, Mar. 29-31 and Apr. 11-12, 1935, F. K. To; three between Cheung-kon-ts'uen and Tai-pin-ts'uen, July 19, 1935, two at Tai-pin-ts'uen, July 24, 1932 and May 5-7, 1935, one in vicinity of villages at foot of Lai-mo-ling (Loi Mother Mt.), May 25-28, one at Tai-tsing-lan-ts'uen, back of Lai-mo-ling, June 17-18, 1935, F. K. To; three at Nodoa, Apr. 23, June 4-10, 1932, F. K. To, and Aug. 1-12, 1936, T. C. Li; one at Lin-fa Shau, alt. 2,000 ft., SE. of Nodoa, June 9, 1932, O. K. Lau and F. K. To; two at Lok-kei, 9 mi. NNW. of Nodoa, June 1, 1932, F. K. To, and June 18, 1932, O. K. Lau and F. K. To; one en route Nodoa to Nam-fung, June 22 and three at Nam-fung, June 25-30, 1932, O. K. Lau and F. K. To; one at Ch'ung-mei, 15 mi. SE. of Nam-fung, Aug. 18-19, and one at Nai-suen, 21 mi. SE. of Nam-fung, Aug. 31, 1932, F. K. To; one at Koni-yan and vicinity, Kan-yen Dist., Mar. 9, 1935, F. K. To; and one in the Five Finger Mts., Ting-an Dist., Hainan, Apr. 25-27, 1932, W. E. Hoffmann. Kwangtung—two at Iu-ling-pai, Yao Shau, Lien Dist., Sept. 28 and Oct. 4-6, and four at Naam-kong-pai, Yao Shan, Yang-shan Dist., Oct. 23-26 and Nov. 4-6, N. Kwangtung, 1934, F. K. To.

Large, rounded in outline, with a strong dorsal tubercle; elytral disk with somewhat irregular surfaces and impressed with fine punctures in slightly irregular rows. Disk pale testaceous to ochraceous; explanate margins hyaline except at anterior and posterior lateral angles where ochraceous to pitchy extensions from disks reach more or less close to external margins. Length 10.8-13.2 mm.; breadth 10.4-12.5 mm.

Genus **Laccoptera** Boheman, 1855

Key to Species

- A. Pronotal disk strongly wrinkled, mainly in longitudinal and oblique directions; explanate margins of elytra either with dark patches at anterior and posterior lateral angles, or without any such spots; dorsal surface of body with thirteen spots or less B.
- Pronotal disk almost without wrinkles, sometimes finely punctured; explanate margins of elytra with black patches only at posterio-lateral angles; dorsal surface of body with more than thirteen spots, generally about twenty-six C.
- B. Dorsal surface of body generally with less than thirteen spots; pronotum with a small round spot on each side of disk; elytral margins with dark patches behind humeri and in posterio-lateral portions.....
- *quadrimaculata bohemani* Weise
Dorsal surface of body with thirteen black spots; pronotum usually immaculate; explanate margins of elytra lacking dark patches; metasternum only slightly pitchy ... *tredecimpunctata* (Fabricius)
- C. Pronotum finely punctate; explanate margin of elytra heavily punctured near humeri; color yellowish-testaceous, shiny; lateral spots of elytral disks more or less united *vigintisexnotata puncticollis* Gressitt
Pronotum unpunctate; explanate margins of elytra shallowly punctured near humeri; color reddish-brown, slightly dull; lateral spots of elytral disks free *v. vigintisexnotata* Boheman

14. **Laccoptera quadrimaculata bohemani** Weise

Laccoptera quadrimaculata var. *bohemani* Weise, 1910, Verh. Naturf. Ver. Brunn 48 : 42 (S. China)

Fifty-seven specimens were collected in Kwangtung, Fukien, Kwangsi, Tongking and Hainan Island, as follows: fifteen at Canton—Sept. 20, 1932, H. C. Kam; Nov. 15, 1929, W. S. Wong; Nov. 30, 1932, T. P. Lau; June 6 and Oct. 26, 1932, July 19, 1933, May 20, 1935, W. E. Hoffmann; May 6, July 13 and Aug. 2, 1932, Y. W. Djou; Dec. 2, 1931, Biology Staff; spring, 1932, M. C. Chen; Sept. 20, 1932, P. P. Ho; Sept. 17, 1933 and Oct. 14, 1936, F. K. To. One at White Cloud Mt., near Canton, Apr 16, 1935, Y. W. Djou; two at Tsin-leung Shan, Oct. 1-5, and four at Yam-na Shan, Sept. 18, Mei Dist., 1933, F. K. To; two at Yao Shan, Lien' Dist., Apr. 24, 1934, F. K. To; one at Naum-kong-paai, Yao Shan, Yang-shan Dist., Oct. 18, 1934, F. K. To; and one at Tai-wa-tszi, 5 mi. NW. of Ts'ing-yuen City, Ts'ing-yuen Dist., Kwangtung Prov., July 28, 1935, Chauncey W. Browne; four at Cha-po-hui, Kien-yang Dist., Fukien, May 10-18, and five at Yen-ping, Nan-ping Dist., Fukien, June and July, 1933, D. C. Ngu; one in mountains 5 mi. S. of Lungchow, Lung-cheu Dist., Kwangsi, Aug. 8, 1934, E. R. Tinkham; two at Laokay, Tongking, Indo-China, Aug. 12-15 1934, Chauncey Browne. Hainan Island: one Apr. 30, 1932, W. E. Hoffmann; two at Kachek, May 1-11, 1932, F. K. To; one at Ngai-chau, Yai Dist., May 27, 1932, W. E. Hoffmann and O. K. Lau; two at Nam-fung, June 29, 1932 and Mar. 23, 1935, O. K. Lau and F. K. To; one at Cheung kon-ts'u'en, Apr. 11, four at Tai-pin-ts'u'en, Apr. 20-26 and

May 5-11, one in vicinity of villages back of Lai-mo-ling, May 25, and one at Tsing-lam-ts'uen, Ting-an Dist., June 5, 1935, F. K. To; two at Lung-hou and Lung-tong, Ting-an Dist., Apr. 21-22, 1932, W. E. Hoffmann and O. K. Lau, two at Lok-kei, Tan Dist., June 18, 1932, O. K. Lau and F. K. To; one at Ts'ung-to (Sam-kok-ling), June 14, 1932, O. K. Lau and F. K. To, and one at Hau-zing-ts'uen, Aug. 8-9, F. K. To, SE. of Nodoa, Lin-kao Dist., Hainan I.

Elytral disks yellowish-brown tinged with reddish; extreme bases of explanate margins of elytra reddish-testaceous followed by a pitchy brown or blackish band; some irregular spots on disk at, and behind, middle, and a posterio-lateral squarish black spot on each explanate margin. The sutural angles of the latter are generally pitchy or blackish. The specimens from Indo-China and Kwangsi Province each has a small blackish spot on each side of pronotal disk and fronts of humeri and post-scutellar raised portion black. Length 7.8-9 mm.; breadth 6.6-7.5 mm.

15. *Laccoptera tredecimpunctata* (Fabricius)

Cassida tredecim-punctata Fabricius, 1801, Syst. Eleuth. 1 : 398
Laccoptera tredecim-punctata, Boheman, 1855, Mon. Cassid. 3 : 73.

Two specimens were collected on Hainan Island in 1929 by Prof. W. E. Hoffmann.

Elytral disks of a darker reddish than in the preceding: dorsal surface with thirteen black spots, the odd one being a common spot at raised portion of suture; explanate margin lacking dark bands. Length 7 mm.; breadth 5.8 mm.

16. *Laccoptera vigintisexnotata puncticollis* Gressitt

Laccoptera vigintisexnotata puncticollis Gressitt, 1938, Ling. Sci. Jour. 17 (2) : 189 (Ta Hian and Ta Hian, central Hainan Island).

Six specimens were collected on Hainan Island; one between Lung-hou and Lung-tong, Ting-an Dist., Apr. 21, 1932, W. E. Hoffmann and O. K. Lau; one at Kachek, May 12, 1932, F. K. To; one at Lok-kei, NNW. of Nodoa, June 18, and one at Nam-fung, June 25, 1932, O. K. Lau and F. K. To; and two at Hau-ying-ts'uen, SE. of Nodoa, July 31-Aug. 6, 1932, F. K. To.

Yellowish-testaceous, shining, marked with about twenty-six black spots on dorsal surface, six of them on pronotum and the largest on sides of elytral disks; antennae with last four or five segments black and strongly flattened; ventral surfaces largely testaceous. Length 8.7-9.2 mm.; breadth 6.6-7.3 mm.

17. *Laccoptera v. vigintisexnotata* Boheman

Laccoptera vigintisexnotata Boheman, 1855, Mon. Cassid. 3 : 66.

One example was collected at Laokay, Tongking, French Indo-China, Aug. 12-15, 1935, by Chauncey Brownell.

Reddish-brown, with explanate margins brownish-ochraceous and subhyaline, a prominent oblong black spot at posterio-lateral portions of margins of elytra; ventral surfaces of body largely blackish or pitchy. Length 10.5 mm.; breadth 8.6 mm.

Tribe *Coptocyclini*

Genus *Thlaspida* Weise, 1899

18. *Thlaspida japonica* Spaeth

Thlaspida japonica Spaeth, 1914, Suppl. Ent. 3 : 17 (Japan).

Twenty-three specimens were collected in Kwangtung and Hunan Provinces, and on Hainan Island. Kwangtung: three at Yao Shan, May 3-8, three at Fong-tong-ping, Hoh-kai-hon, July 4-5, two at Keung-tin-heung, July 13-19, Iu-ling-paai, Yao Shan, Sept. 29, and Cheung-t'ong-ts'uen, Sheung-shui-heung, Aug. 21, Lien Dist., 1934, F. K. To. Hunan: four at Tai-kwong Village, Lam-mo Dist., July 20, 1934, F. K. To. Hainan I.: one at Cheung-kon-ts'uen, Mar. 27-28, and one at Sam-kwong-ts'uen, Lam-wan-tung, Aug. 19, Kiung-shan Dist., 1935, F. K. To; one at Hau-ying-ts'uen, SE. of Nodoa, Aug. 1, and one at Taai-po, 27 mi. from Nam-fung, June 27, 1932, O. K. Lau and F. K. To; and one at Tai-tsing-lam-ts'uen, back of Lai-mo-ling, June 17, 1935, F. K. To. New to Hunan Province.

Rounded-hexagonal in outline, broadest just behind humeri; elytra rough, but shining, deeply seriate-punctate with raised costae, and the suture strongly raised a short distance behind scutellum; pronotum impunctate. Explanate margins nearly colorless, and transparent, except for reddish-brown squarish spot on posterio-lateral portions; pronotal disk reddish-brown mixed with ochraceous; elytral disks reddish at sides and on front of dorsal tubercle, testaceous-brown dorsally. Length 6.7-8.2 mm.; breadth 5.5-7 mm.

Genus *Metriona* Weise, 1896

Key to Species

- A. Elytral suture only slightly raised at highest point; no elevated X-shaped mark present; puncture-rows fairly regular B.
- B. A raised, transverse X-shaped mark crossing suture at highest point of elytra; puncture-rows irregular and interrupted at intervals C.
- B. Pronotum immaculate; elytra with several more or less fused black spots along middle of each disk and some smaller isolated ones along each side of suture; length over six mm. *objecta* Spaeth
- Pronotum generally with some black markings, or else entire dorsal surface testaceous with some green tinges along each side of suture and near lateral borders of elytral disks; length less than five mm. *circumdata* (Herbst)
- C. Dorsal X-like mark of elytra not strongly contrasted with surrounding area; explanate margins less than two-thirds as broad as elytral disks before middle; pronotal disk deeply impressed on each side near base, reddish-testaceous in color *thais* (Bohemian)

Dorsal X-like mark greenish-yellow or testaceous, contrasting to darker surrounding portions of elytral disks; explanate margins about two-thirds as broad as elytral disks before middle; pronotal disk rather evenly convex, marked on basal portion with black *thais* subsp.?

19. Metriona circumdata (Hebst)

Cassida circumdata Herbst, 1799, *Natursyst. Kafer* 8 : 268, pl. 132, fig. 11 (India).

Coptocycla circumdata Boheman, 1855, *Mon. Cassid.* 3 : 279.

Metriona circumdata Spaeth, 1903, *Ann. Mus. Nat. Hung.* 1 : 128.

?*Metriona circumdata* ab. *pescadorensis* Chujo, 1934, *Sylvia, Taihoku, Formosa*, 5 : 162 (Pescadores Islands).

?*Cassida cuticula* Gressitt, 1938, *Ling. Sci. Jour.* 17 (2) : 191 (Ta Han, Hainan).

Seventy-seven specimens were collected in Kwangtung, Fukien and Kwangsi Provinces, S. China, in Tongking, Indo-China, and on the islands of Hainan and Hong Kong. Kwangtung: twenty-one on Honam Island, Canton—April, May and October, 1933, W. E. Hoffmann; Apr. 13, 1933, Y. W. Djou; June 17, 1933, Y. T. Feng; summer 1934 and Mar. 8, 1936, on *Citrus*, W. E. Hoffmann; Apr. 16, 1935, Y. W. Djou; July 30, 1932, and 1933, W. E. Hoffmann; Sept. 20, 1932, T. P. Lau. One at White Cloud Mt., near Canton, July 6, 1932, Y. W. Djou; four at Ng-ts'u'en, Meu-ming Dist., July 1932, W. E. Hoffmann; three in Lien Dist. (Linchow), Apr. 16-20, one at Yao Shan, May 9, two at Lu-ling-paai, Yao Shan, one at Sheung-shui-heung, Aug. 26, and one at Shek-t'ong-ts'u'en, Aug. 18, Lien Dist., 1932, F. K. To; one at Shek-lung, July 21, 1921, C. W. Howard, one at Tai-ping, Lo-ting Dist., July 6, 1932, W. E. Hoffmann; one at Hop-shui, July 7 and two at Ts'in-pai, July 9, Sin-i Dist., 1932, W. E. Hoffmann; one at Mui-luk, Meu-ming Dist., July 15, 1932, W. E. Hoffmann; one at Tai-wa-tsz, ts'ing-yen Dist., July 28, 1935, Chauncey W. Brownell; one at Tung-kwan, June 6, 1935, S. Y. Lau. Fukien: three at Yen-ping, Nan-ping Dist., June-July, 1933, D. C. Ngu. Kwangsi: one at Nanning, Yih-ning Dist., Aug. 2-3, 1934, E. R. Tinkham. Hong Kong: six in Aug. 1933, W. E. Hoffmann, and one on Barker Road, Victoria, Aug. 6, 1934, Y. W. Djou. Indo-China: one in WNW. Tongking, Aug. 12-13, 1934, E. R. Tinkham. Hainan I.: three at Hoihow, Kiung-shan Dist., 1932, W. E. Hoffmann, and May 16, 1932, F. K. To; one at Cheung-kon-ts'u'en, Apr. 13, 1935, F. K. To; one at Tai-piu-ts'u'en, July 20, one at Nam-liu-tin, July 26, 1935, one at Kacheck, May 1-6, 1932, two at Nodoa, Mar. 18-22, 1935, F. K. To; one at Ts'ung-to (Sain-kok-ling), 9 mi. SE. of Nodoa, June 14-16, 1930, one at Nain-fung, July 3-5, 1932, O. K. Lau and F. K. To; one at Leung-hon to Lung-tong, Ting-an Dist., Apr. 21, 1932, W. E. Hoffmann and O. K. Lau; one at Ch'ung-mei, Lin-kao Dist., Aug. 27, 1932, one at Kau-sha, Yai Dist., Mar. 4-5, 1935, and one at Sam-kwong-ts'u'en, Lam-wan-tung, Aug. 5-6, 1935, F. K. To.

Small, subrounded, evenly convex above: humeral angles not projecting. Body testaceous, with a variable black marking on base

of pronotum and a large U-shaped mark formed of a stripe along central portion of disk of each elytron, meeting at suture near apex, and a common stripe on basal half of suture, black and greenish tinges on inner and outer portions of disks, or with entire dorsal surface testaceous, with suggestions of greenish tinges of the striped phase (*cuticula* Gressitt). Length 4.2-5.6 mm.; breadth 3.2-4.7 mm.

I doubt that *cuticula* will even merit subspecific standing, because of the similarity of its distribution to that of *circumdata* in these regions, and the apparent lack of structural differences, and I suspect that *pescadorensis* represents the same form.

20. *Metriona objecta* Spaeth

Metriona objecta Spaeth, 1919, Ann. Mus. Hung. 17: 203 (Siam).

Nine specimens were collected on Hainan Island: one at Hau-ying-ts'uen, SE. of Nodoa, July 31, and Ch'ung-meı, SE. of Nam-fung, Aug. 29, Lin-kao Dist., 1932, F. K. To; Nam-fung, July 1, 1932, F. K. To; Lin-fa Shan, E. of Nodoa, July 21, and Fan-ta-ts'uen to Poh-shang, Hung-mo-tung, July 21-Aug. 1, 1929, Lingnan Univ. Fifth Hainan Island Expedition; Cheung-kon-ts'uen, Mar. 27, Tai-sing-lam-ts'uen, back of Lai-mo-ling, June 19, and Ham-po-ts'uen, Chung-mai Dist., Aug. 28, 1935, F. K. To.

Moderate-sized, rounded-pentagonal, strongly convex, steeply declivitous posteriorly; suture slightly raised behind scutellum. Pale testaceous; pronotal disk somewhat ochraceous; elytral disks tinged with golden and in part with yellowish-green, and marked with irregular black spots along middle of each disk and with smaller ones on each side of suture. Length 5.8-6.8 mm.; breadth 5.5-5.8 mm.

21. *Metriona thais* (Bohemian)

Coptocycla Thais Boheman, 1862, Mon. Cassid. 4: 463.

Metriona Thais Spaeth, 1914, Col. Cat. 62: 144.

Coptocycla thais var. *crucifera* Kraatz, 1879, Deutsche Ent. Zeitschr. 23: 271.

Ten examples were collected in Kwangtung, Hunan and Kiangsi Provinces: three at Taam-yuen-tung, May 26-June 6, two at Iu-ling-paai, Yao Shan, Oct. 1-10, one on Yao Shan, May 6-8, and one at Lung-ping-hui, May 15, Lien Dist., N. Kwangtung, 1934, F. K. To; one at Loh-fau Shan, Big Pool, alt. 2,800 ft., Kwangtung, Oct. 11, 1935, E. R. Tinkham; one at Tai-kwong village, Lam-mo Dist., Hunan, July 26-28, 1934, F. K. To; and one at Kuling, Kiukiang Dist., N. Kiangsi, July 23-26, 1933, Y. W. Djou. Unrecorded from Kwangtung, Hunan and Kiangsi Provinces.

Small, subrounded, strongly convex; disks reddish with dorsal swollen areas on elytra ochraceous; explanate margins pale with sometimes a narrow bar on postero-lateral portions of those of elytra. Length 5.3-6.2 mm.; breadth 4.9-5.3 mm.

22. *Metricona thais* subsp.?

Metriona thais crucifera Gressitt, 1938, Ling. Sci. Jour. 17 (2) :191
(Hainan I.).

Two examples were taken on Hainan Island in 1935 by F. K. To: one at Kom-yan City and vicinity, Kan-en Dist., Mar. 9, the other at Tai-pin-ts'uen, Lam-ka-heung, Lai-mo-ling (Loi Mother Mt.), Apr. 25-26.

23. Metriona sp.

One example, possibly of a new species, was taken at Sam-kwong-ts'uen, Lam-wan-tung (Loi territory), Kiung-shan Dist., Hainan I., on August 5, 1935, by F. K. To.

Tribe Cassidini

Genus **Deloyala** Redtenbacher, 1858

24. ***Deloyala vespertina*** Boheman

Cassida (Deloyala) vespertina Boheman, 1862, Mon. Cassid. 4 :357 ('China')

Six specimens were collected in Kwangtung and Hunan Provinces as follows: one at Yao Shan, Apr. 24, one at Iu-ling-paa, Yao Shan, Oct. 9, one at Fong-tong-ping, Hoh-kai-hon, July 6-7, and one at Keung-tin-heung, July 19, Lien Dist., N. Kwangtung, 1934, F. K. To; one at Tai-kwong Village, July 21, and one at Siu-kwong Village, July 23, Lam-no Dist., S. Hunan, 1934, F. K. To. New to Kwangtung and Hunan Provinces.

Subpentagonal in outline, narrowed posteriorly; dorsal surfaces rough; elytra, including parts of explanate margins, coarsely rugose with a transverse, strongly raised area across suture behind scutellum. Dorsal surface of body largely pitchy brown to black, except for anterior third of pronotum, central, smooth area on each side, and small area at apices of explanate margins of elytra, which are subhyaline; ventral surfaces pitchy brown, with thoracic sternites largely black. Length 5.8-6.7 mm.; breadth 5.4 mm.

Genus **Cassida** Linnaeus 1758

Key to Species

- A Pronotum, including explanate margins, coarsely and irregularly punctured; explanate margins of pronotum and elytra dull, not transparent, deeply punctured; length of body generally over 5.5 mm. B Pronotum not coarsely punctured, its explanate margins impunctate; margins of pronotum and elytra hyaline, shining, more or less transparent, shallowly punctured; length of body generally less than 5 mm. C.

B Pronotum subangulate laterally; elytral disks dull brown, somewhat irregularly punctured; explanate margins reddish; legs black. *fuscorufa* Motschulsky

..... otum broadly rounded laterally; elytral disks shining, ochraceous brown marked with small black spots, regularly striate-punctate; explanate margins yellowish and shining with a few black spots posteriorly; legs castaneous *nebulosa* Linnaeus

- C. Dorsal surface of body generally testaceous brown, sometimes finely marked with blackish; explanate margins of elytra not broader than one-half width of single disk; frons and propleura testaceous..... D.
- Disks of pronotum and elytra largely black; explanate margins very broad, those of elytra more than one-half as wide as single elytral disk; frons and propleura pitchy black; outline subrounded *discale* Gressitt
- D. Pronotal disk shining, distinctly, though finely, punctured; scutellum blunt behind; coxae pitchy; outline of body oblong-oval, subparallel; disks of elytra often marked with black *lineola* Creutzer
- Pronotal disk dull, indistinctly punctured; scutellum triangular, coxae testaceous; outline of body ovate, narrowed posteriorly; elytral disks immaculate *obtusata* Boheman

25. *Cassida discale* Gressitt

Cassida discale Gressitt, 1938, Ling. Sci. Jour. 17(3) :386 (Hong Shan, S. Kiangsi).

One example was taken in Bird Gorge, alt. 3,400-3,800 ft., Loh-fau Shan, near Canton, Kwangtung Prov., Oct. 15, 1934, by Y. W. Djou. New to Kwangtung Province.

This second specimen differs from the type in being larger, in having the pronotum black above the head, the elytral disks lacking pale spots, but distinctly margined with ochraceous, the ventral surfaces largely pitchy black and the legs castaneous. Length 5 mm.; breadth 4.55 mm.

26. *Cassida fuscorufa* Motschulsky

Cassida fuscorufa Motsch., 1866, Bull. Mosc. 39 (1).178 (Japan).

Cassida consociata Baly, 1874, Trans. Ent. Soc. London 213 (Japan and Tartary coast).

Cassida russata Weise, 1889, Horae Soc. Ent. Ross. 23 : 646 (Turkestan).

A single specimen was taken at Kuling, Liu-kiang Dist., N. Kiangsi Prov., July 23-26, 1933, by Y. W. Djou. New to Kiangsi.

Dull rusty brown; explanate margins paler, somewhat reddish; surfaces dull and rough; punctuation somewhat irregular. Length 7 mm.; breadth 4.8 mm.

27. *Cassida lineola* Creutzer

Cassida lineola Creutzer, 1799, Ent. Vers. : 119, pl. 2, fig. 23 (Europe).

Five specimens were collected in Kwangtung Province: four on Honam I., Canton; Aug. 1, 1932, Y. W. Djou; and May 20, 1938, at lights, K. C. Yeung; and one at Naam-kong-paai, Yao Shan, Yang-shan Dist., Nov. 1-5, 1934, by F. K. To. New to Kwangtung Province.

Small, oval; moderately shining, testaceous-brown, with paler margins; elytra generally spotted or irregularly striped with blackish. Length 5-5.5 mm.; breadth 4-4.3 mm.

28. Cassida nebulosa Linnaeus

Cassida nebulosa Linn., 1758, Syst. Nat., ed. 10 :363 (Europe).

One specimen was collected 6 mi. S. of Hwang-mei, Hwang-mei Dist., Hupeh Prov., Aug. 1-6, 1933, by Y. W. Djou. New to Hupeh Province

Oblong-oval, closely punctured on pronotum and seriate-punctate on elytral disks; testaceous-brown, shining, finely spotted with black on elytra. Length 6.3 mm.; breadth 4.4 mm.

29. Cassida obtusata Boheman

Cassida obtusata Boheman, 1854, Mon. Cassid. 2 : 405 (India and China); Spaeth, 1914, Suppl. Ent. 3 : 19.

Ninety-three specimens were collected in Kwangtung Province mainland and on Hainan Island. Kwangtung: sixty-two were taken on Honam Island, Canton—one on *Celosia argentea* L., Jan. 8, 1924, W. E. Hoffmann; one in Apr. 1931, three in 1931 on *Citrus*, one in spring, 1932, M. C. Chen; two in 1926, six on Oct. 28, 1922, one summer, 1934, and two in 1936, W. E. Hoffmann; one in April 1933, F. K. To; one Dec. 24, 1934 and two Sept. 1935, F. K. To; two Mar. 3, twenty-nine Mar. 8, on *Citrus*, and one Mar. 27, 1936, W. E. Hoffmann; three Oct. 11, 1936, feeding on Cocksecomb, W. E. Hoffmann; one Oct. 9, 1936, F. K. To. Nine at Hop-po (Lim-chow), Hoh-p'u Dist., Aug. 1-7, 1932, W. E. Hoffmann; one at Ng ch'u'en, Wu-chw'an Dist., July 18, 1932, W. E. Hoffmann; one at Kwang-chau-wan, Wu-chw'an Dist., July 19, 1932, W. E. Hoffmann; one at river, NW. of On-po, Lien-kiang Dist., July 30, 1932, W. E. Hoffmann; one in Chan-san Park, Kai-kok, Chung-shan Dist., July 27, 1935, K. Y. Li; and two at Ng-ts'u'en, Meu-ming Dist., July 1932, W. E. Hoffmann. Hainan Island: one along stream near Ngau-ma-ts'u'en, S. of Nodoa, July 12, 1929, Lingnan Univ. Fifth Hainan Island Exped.; six at Hoihow, N. Hainan, 1932, June, W. E. Hoffmann, April 11-12, F. K. To, and May 16-19, O. K. Lau; one at Kachek, May 12-20, 1932, F. K. To; one in Five Finger Mts., Apr. 25-27, 1932, W. E. Hoffmann; one at Ngai-chau, Yai Dist., May 27 30, 1932, W. E. Hoffmann and O. K. Lau; one at Ts'ung-to (Sain-kok-ling), 9 mi. SE. of Nodoa, June 14-16, 1932, O. K. Lau and F. K. To; one at Nam-fung, July 24-25, 1932, O. K. Lau and F. K. To; two between Nam-fung and Poh-shang, July 24-25, 1932, F. K. To; one at Loh-fung-tung, Yai Dist., Feb. 17-18, 1935, F. K. To; one at Ngai-u'en City, Yai Dist., Mar. 3, 1935, F. K. To; and one at Cheung-kon-ts'u'en, Mar. 23-28, 1935, F. K. To.

Small, short, rounded-ovate, narrowed posteriorly; testaceous-brown with hyaline margins; elytra with slight greenish tints near scutellum, closely seriate-punctate and slightly shining. Length 3.7-5 mm.; breadth 2.8-4 mm.

30. *Cassida* sp.

One specimen was taken in mountains 5 mi. S. of Lung-chow, Lung-cheu Dist., Kwangsi Province, Aug. 8, 1934, by E. R. Tinkham.

Genus *Chirida* Chapuis, 1896

Key to Species

- Pronotal disk reddish; elytra pale ochraceous on disks, each with the sutural margin narrowly black and with three free diskal spots, one humeral, one at middle near suture, third postero-lateral; diskal punctures mostly more than 4 or 5 puncture-widths apart, longitudinally.....
..... *boweringii* (Bohemian)
- Pronotal disk ochraceous with a basal inverted W-like black mark; elytral disks black with many irregular spots, and outer margin, ochraceous; diskal punctures mostly not more than 2 or 3 puncture-widths apart..
..... *punctata* (Weber)

31. *Chirida boweringii* (Bohemian)

Coptocycla Boweringii Boheman, 1855, Mon. Cassid. 3 : 123 (Hong Kong).
Chirida Boweringii Spaeth, 1914, Col. Cat. 62 : 125.

Nine specimens were collected: one at Wong-po-tung, White Cloud Mt., near Canton, Kwangtung, Nov. 20, 1932, Y. W. Djou; the others on Hainan Island—one at Tai-tsing-lam-ts'uen, back of Lai-mo-ling, June 1-2, 1935, F. K. To; two at Cheung-kong-ts'uen, Apr. 4-14, two at Tai-pin-ts'uen, Apr. 25 and July 24, one at Sam-kwong-ts'uen, Lam-wan-tung, Aug. 5-6, F. K. To, 1935; one at Nam-fung, June 29-30, 1932, O. K. Lau and F. K. To; and one at Ch'ung-mei, 15 mi. SE. of Nam-fung, Aug. 20-22, 1932, F. K. To.

Rounded-oval, strongly convex, smooth; elytra with explanate margins declivitous and disks finely and distantly punctured. Yellowish-testaceous with pronotal disk red and elytra with suture, and six rounded spots, black. Length 5.4-6.8 mm.; breadth 4.8-5.5 mm.

32. *Chirida punctata* (Weber)

Cassida punctata Weber, 1801, Observ. Ent. 1 : 51 (Sumatra).

Chirida punctata Weise, 1897, Deutsche Ent. Zeitschr. : 109.

Twenty-eight specimens were collected, three of them in Kwangtung mainland, and the rest on Hainan Island. Kwangtung: one at Iu-ling-paai, Yao Shan, Lien Dist., Oct. 1, 1934, F. K. To, and two at Nam-kong-paai, Yao Shan, Yang shan Dist., Oct. 13 and Nov. 4-5, 1934, F. K. To. Hainan I.: four at Nodoa, Aug. 23-25, 1932, F. K. To and Aug. 1-26, 1936, T. C. Li; one en route Nodoa to Nam-fung, June 23, 1932, O. K. Lau and F. K. To; four at Nam-fung, June 24, 1932, O. K. Lau and F. K. To, and Mar. 23, 1935, F. K. To; three at Cheung-kon-ts'uen, Apr. 1-12, two en route Cheung-kon-ts'uen to Tai-pin-ts'uen, July 10, three at Tai-pin-ts'uen, May 10-11 and July 25-27, two at Nam-liu-tin, July 29-30, and one at Sam-kwong-ts'uen, Lam-wan-tung, Aug. 7-9, 1935, F. K. To; one at Tun-heung-ts'uen, 6 mi. SE. of Nodoa, between Sam-kok-ling and

Laan-yeung, June 13-14, and one at Lok-kei, 9 mi. NW. of Nodoo, June 18-19, 1932, O. K. Lau and F. K. To; one at Kan-sho, Yai Dist., Mar. 4-5, 1935, F. K. To; and at Cheung-kon City, Ch'ang-kiang Dist., Mar. 12, 1935, F. K. To; and one "Hainan I., 1932, William E. Hoffmann".

Rounded-oval, strongly convex; elytral disks somewhat irregularly punctured, the rows interrupted in part by some low swellings. Explanate margins testaceous; pronotum ochraceous with a biarcuate black marking; elytral disks black with a number of more or less confluent spots, and external borders, ochraceous. Length 5.8-6.7 mm.; breadth 5-5.8 mm.

嶺南大學自然博物採集所之龜形甲蟲
(鞘翅目：金花蟲科：龜形葉蟲亞科)

嘉理思著

嶺南大學自然博物採集所

(摘要)

本文論及龜形甲蟲三十二種，分隸十一屬，中以 *Hoplionota oblongopunctata* 為新種。各屬與品種之檢索表，皆有述及焉。查經研究之標本，約有六百四十；計採自海南島者二十種，廣東十六種，東京四種，福建三種，廣西三種，湖南四種，江西二種，及湖北一種。

NOTES ON SOME CHINESE MARINE ALGAE¹

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The first attempt to bring together the species of the marine algae known from China was made by Collins in 1919. He listed 45 species of which 28 were retained from the older lists of Martens (1866) and Debeaux (1875) and 17 were newly added by him. He excluded all the species of *Sargassum* previously reported because he felt that "it is impracticable to assimilate the different records." Besides the 45 accepted species, he also listed 22 species "recorded from China but unverified and improbable." In this compilation, Collins overlooked the important list of Cotton (1915). Tilden (1929), in her compilation of all the Chinese algae then known to her, listed 92 species of marine algae which include the lists of Cotton (1915), overlooked in Collins' compilation, of Cowdry (1922) and of Howe (1924). The latest compilation was by Grubb (1932) who took away from Tilden's list 6 species which are either "sold in the markets" or recorded from Formosa and added 12 more species, thus making a total number of 98 species of Chinese marine algae.

In the above compilations of the Chinese marine algae, records that are scattered in various works were overlooked. Some of these have been accidentally discovered in the course of my study on Chinese marine algae and undoubtedly some more are awaiting discovery. Among the some 300 species thus far known from China, some are recently found to be erroneously named and some need changes of names. Many species which seemed rare on our coast are recently found to be much more extensively distributed. The present paper will thus be devoted to some of the algae which are already known from the China coast but which, owing to the above stated, and various other reasons, it seems worth while to mention again.

Monostroma nitidum Wittr.

Monogr. Monostr., p. 41, pl. 2, fig. 7, 1866; Okamura, Alg. fr. Ogasawara-jima, p. 100, 1897; Yamada, Stud. Meeresalg. Formosa I. Chlorophyc., p. 78, 1925; ibid. Mar. Chlorophyc. fr. Ryukyu, p. 34, 1934.

The type of the present species comes from the Friendly Islands. The author of this species credits it also to China, "Herb. Schwartzii." The definite locality is not mentioned but since the present species is an inhabitant of the warmer waters, the specimen must have come from either Hong Kong or Macao as did many of the early known plants credited to "China." This alga has a thallus

¹ Contribution from the Botanical Survey, Lingnan University, formerly a part of the Lingnan Natural History Survey and Museum.

about 20-30 μ thick. In the surface view, the cells are polygonal, mostly grouped in twos and slightly rounded at the corners. A transverse section shows that they are roundish in shape. The color of the plant is slightly bluish-green in the living state changing to a yellowish-green when dried. It is very soft and lubricous, adhering very closely to paper in drying.

Wittrock remarks that this species is "officinalis in China." This is true in the different places where I have collected it. It is used extensively for food. Its delicacy has been especially appreciated by the people in Amoy where it is popularly known under the vernacular name, *Chiao-mo* (礁膜²), which means "membranes of hidden rocks." Under *Monostroma* sp. I have already reported it in a paper dealing with the economic seaweeds of Amoy (Tseng, 1933). It is "collected during early spring by handpicking or with the help of a bamboo rake, dried in sun without being washed, and marketed in the dry condition." It is "used as a condiment in flavoring spring-roll-cakes (春餅). For this purpose, the thalli are chopped fine and fried in peanut oil before mixing with the other ingredients to which it imparts a flavor which is much appreciated by the Amoy people." It costs about 30 to 40 cents per catty.

This is a widely distributed species on our southern coast. It starts growth in late December or early January and grows most abundantly in March-April, when the rocks in more sheltered places, especially the slightly muddy ones near high tides, are seen to be covered by nothing else but the present plant.

HABITAT: Abundant on rocks in the upper littoral belt, in sheltered places. Kulangsu and Amoy in March-April (*Tseng* 26, 27); Hong Kong: Stanley Beach, in December-April (*Tseng* 248, 263, 483, 583), Repulse Beach, in April (*McClure* A54); Kakjio (角石), Swatow, in February-March (*Tseng* 493). Macao, in March (*Tseng* 669); Chongwu (崇武), Chuanchow (泉州), Fukien, in April (*Tseng* 1358).

DISTRIBUTION: Friendly Is.; China; Japan; Bonin Is.; Riukiu; Formosa.

***Ilea Fascia* (Muell.) Fries**

Fl. Scan., p. 321. 1835; *Tseng* and Li, Mar. Alg. Tsingtao and Chefoo, p. 210, 1935.

In Tsingtao where this alga has already been reported, it is very common from November to early May. It has also been collected from Hong Kong in March. Its strap-shaped, brown membrane is very similar to that of *Endarachne Binghamiae* J. Ag. with which it is very easily confused, especially when both are found in the same locality at nearly the same time. In general, it has a much thinner

² Pronounced *Tah-mo* in the Amoy dialect

thallus. A transverse section will tell the difference definitely, since the present species has a parenchymatous medulla, while the *Endarachne* has its medulla consisting of densely intertwined, branched filaments.

This species seems to be normally a member of the colder waters of the northern coast and invades the warmer waters of the south only in the colder season of the year. In the south, it is found, so far only in Hong Kong. Its occurrence in the intervening regions is, however, expected. The *Endarachne*, on the other hand, is normally an inhabitant of the warmer waters and does not extend its distribution north of the Chushan Islands, Chekiang.

Setchell and Gardner (1925) remark that "typical *Ileu Fascia* has neither hairs nor paraphyses." I have not found paraphyses in our specimens, but I have found hairs to be quite well developed in all the specimens examined. Kuetzing, in his *Phycologia Generalis*, also shows such hairs in his figures 1 and 2.

HABITAT: On rocks and in rock pools between tides. Stanley Beach, Hong Kong, in March (*Tseng* 609); Tsan-chiue (棧橋), Tsingtao, in November (*Tseng* 1760) and March (*Tseng* 1855).

DISTRIBUTION: Probably cosmopolitan.

Endarachne Binghamiae J Agardh.

Anal. Alg. Contr. III, p. 26, pl. 1, fig 5, 1893; Tseng, Mar. Alg. Amoy, p. 25, pl. 3, fig. 13, 1936.

This has already been reported from Hong Kong (Cotton, 1915) and Amoy (Chiao, 1933; Tseng, l.c.). It is rather common on our southern coast during early summer. As already stated, its chief structural difference from the above mentioned species lies in its filamentous medulla. In younger specimens, however, this difference is not so clear as in the older ones since parenchymatous tissue is so well developed as to sometimes obscure the poorly developed filamental structures. Careful examination of the transverse section will, however, detect the presence of such filaments. A longitudinal section will show them still better.

HABITAT: On rocks in the littoral belt. Stanley Beach, Hong Kong, in December-May (*Tseng* 249, 271, 319, 572); Swatow: Hai-mun (海門) (*Tseng* 536) and Tong-hu (東湖) (*Tseng* 548), in February-March; Tungshan I. (東山島), in December (*Tseng* 2269); Chong-wu, Chuanchow, in April (*Tseng* 1343, 1366); Haitan I. (海壠島), Fukien, in May (*Tseng* 2052); Chushan Is. (舟山群島), Chekiang: Fisherman I. (漁子湖), in June-July (*Tseng* 1427), East Saddle I. (鞍山), in May-July (*Tseng* 1427, 1496, 1928), and Kang-shan I. (貢山), in June (*Tseng* 1951).

DISTRIBUTION: California; Japan; China.

Dictyopteris divaricata (Okam.) comb. nov.

Haliseris divaricata Okam., Icon. Jap. Alg. 1 (3) : 37, pl. 13, figs. 1-3; pl. 14, fig. 5, 1907.

Neurocarpus divaricatus (Okam.) Howe, Chin. Mar. Alg., p. 138, 1924; Tseng and Li, Mar. Alg. Tsingtao and Chefoo, p. 213, 1935.

Haliseris evanescens Yendo, Nov. Alg. Jap. Dec. I-III, p. 2, no. 4, 1920 (*fide* Okamura).

The transfer of the name is necessary since *Dictyopteris* is a nomenum conservandum³. This species has already been reported from Chefoo (Howe, 1924; Tseng and Li, l.c.), Tengchoufu (Howe, 1934) and Tsingtao (Tseng and Li, l.c.). It is a very common species in the northern Chinese marine flora.

Martens (1866) reported *Haliseris polypodioides* Lx. from Tschifu (Chefoo). This record is not accepted by Collins (1919) nor by later authors compiling lists of Chinese marine algae. I have also a great doubt in the occurrence of this species on our coast. Most probably Martens' record was based upon *Dictyopteris divaricata*, although I express this opinion without seeing his specimens.

HABITAT: In rock pools in the littoral belt. Pao-tai-shan (跑台山), Chefoo, in July-August (Tseng 1263, 1583); Tsingtao: Yen-er-tao (燕兒島), in July (Tseng 1556) and Tsan-chiue, in April (Tseng 1880); Mau-tao-shan (貓頭山), Weihaiwei, in August (Tseng, 1690); Dairen, in May (Y. C. Liu, s.n.).

DISTRIBUTION. Japan; Korea; China.

Dictyopteris latiuscula (Okam.) comb. nov.

Heliseris latiuscula Okamura, Icon. Jap. Alg. 1(3) : 59, pl. 14, figs. 1-4, 1907.

Neurocarpus latiusculus (Okam.) Okam., 1928, l.c. 5(10) : 190; Tseng, Mar. Alg. Amoy, p. 26, 1936.

This species is very nearly related to *D. prolifera* and, according to its author, is distinguished from the latter by the much broader wings. This character, however, may not be very constant. This species may be merely a form of the earlier published *D. prolifera*. More materials, however, are necessary to settle this problem.

On the China coast, it is known, so far, only from Amoy and only from the drift.

DISTRIBUTION: Japan; China.

Porphyra tenera Kjellm.

Jap. Art. af Slægt. *Porphyra*, p. 35, pl. 1, fig. 6, pl. 4, fig. 2-5, pl. 5, fig. 22-26, 1897; Ueda, Jap. *Porphyra*, p. 20, pl. 1, fig. 4, 12, pl. 3, fig. 14, pl. 4, fig. 1-10, pl. 14, fig. 2-3, pl. 15, fig. 1-3, pl. 16, fig. 1-2, 1931.

When I mentioned the present species from Swatow, Kwangtung Province (Tseng, 1935), I was not entirely without doubt. Having now re-examined my Swatow specimens more carefully, I arrived at

³ Briquet, J.—International Rules of Botanical Nomenclature, 1935, p. 85.

the conclusion that they cannot be referred to *P. tenera* Kjellm. I am, however, still unable to refer them to the species satisfactorily. *P. tenera* Kjellm. should, therefore, be removed from the algal list of Kwangtung.

In the meantime, I have been able to confirm the presence of the present species on the China coast, although on a part entirely different from Swatow, namely, Tsingtao and Dairen. At Tsingtao where I have been able to observe it in the living condition very carefully, it begins to appear in the first or second week of February when the water temperature begins to rise. About a month later, mature specimens have been collected although by no means abundant. Its growth is most luxuriant in April and then declines gradually until early June when only a few fragments in the lower littoral or sublittoral belts can be found. It disappears totally in the latter part of June.

At its earlier stages, the frond is of a linear, oblanceolate shape, the growth being more in a longitudinal direction. When it is about 6-10 cm. long, the growth begins to become nearly equally active on both directions and the frond begins to broaden and broaden until a more or less orbiculate shape results. Plants as much as 26 cm. long and 24 cm. broad are not uncommon. The color of the frond also varies with age, being light pink when young, gradually turning to a darker purple when older. It is attached by means of a cushion-shaped holdfast as are most other members of this genus. The edge of the frond is undulate and when examined microscopic-ally, it is seen to be entire, without any trace of microscopic teeth.

The frond is monostromatic, about $15-25\mu$ in the vegetative, $25-30\mu$ in the sporocarpic, and slightly thicker still in the antheridial part. The vegetative cells are about $1\frac{1}{2}$ times as high as broad. The plant is monoecious and the sporocarps and the antheridia are found intermingled at the marginal portion of the frond. At first, the reproductive organs are found only at the tip and along the margin. Then, the formation of these sexual organs proceeds gradually inward and downward. When mature, the marginal portion is colorless, consisting of antheridia, together with an empty network of cell walls of the sporocarps and antheridia which have already discharged their contents. Each mature sporocarp contains eight carpospores in two tiers of four each, the formula for the cell division being $8(\frac{a}{2}, \frac{b}{2}, \frac{c}{2})$. Each mature antheridium contains 64 spermatia in four tiers of sixteen each, the formula being $64(\frac{a}{4}, \frac{b}{4}, \frac{c}{1})$.

The identification of the present species is made on the basis of the above cited works of Kjellman and Ueda, supplemented by a careful, comparative, morphological study of several Japanese specimens of the species, collected and identified by Professor S.

Ceda of the Imperial Fisheries Institute, Tokyo, Japan. Kjellman, in describing the present species, defines it as *dioecious*. This fact had given the Japanese phycologists a great perplexity since they find that their "*P. tenera*" is *monoecious* instead. Fortunately, Yendo (1916) had been able to examine Kjellman's type specimen and was thus enabled to solve the problem: "But by an actual examination of the original in the Botanical Museum at Upsala, I could prove it to be monoecious." Thus, the greatest obstacle in the interpretation of the present species has been removed. This is the species commonly cultivated on a large scale in Japan and undoubtedly the plant Ueda identified and describes in detail and, as such, should be the same as that of Yendo and consequently that of Kjellman.

The present species resembles *P. leucosticta* Thur. (=*P. atropurpurea* De Toni) so much that the problem whether they represent the same species or different ones will always exist unless studies on both type specimens are carefully made. The formulae for the division of the antheridia and sporocarps given by Hus (1902) for *P. leucosticta* Thur. and by Ueda (1931) for the present species are exactly identical. This will naturally favor the amalgamation of the two species. Ueda, i.c., however, prefers to keep Kjellman's name for the Japanese plant on the basis of certain minor characters. Yendo, i.c., on the other hand, decides that *P. tenera* Kjellm. is identical with *P. leucosticta* Thur. For the time being, I prefer to follow Ueda's opinion in keeping this distinct from the European *P. leucosticta* Thur. until a comparative study of both type specimens can be carefully made.

HABITAT: On rocks, stones, etc., in the littoral belt. Tsan-chiue, Tsingtao, in March (*Tseng 1850, 1862*), Dairen, in May (*C. Y. Liu, s.n.*).

DISTRIBUTION: Japan; Korea.

Porphyra suborbiculata Kjellm.

i.c., p. 10, pl. 1, fig. 1-3, pl. 7, fig. 4-7; Ueda, i.c., p. 15, pl. 1, fig. 11-12, pl. 2, fig. 7-11, pl. 12, fig. 3-4.

The present species has already been reported from Amoy (Ariga, 1919; Tseng, 1933, 1936; Chiao, 1933), Swatow (Tseng, 1935) and Pooto I of the Chushan Islands (Chen and Kao, 1936). The frond of this purple laver is orbiculate or nearly so in all stages of development. Younger plants are entire in outline and pinkish-purple in color while older ones may be variously divided into lobes and darker purple in color. When examined microscopically, the margin is seen to be distinctly dentate owing to the presence of numerous tooth-like outgrowths, each composed of one to a few cells. The frond is monostromatic, about 25-35 μ thick. The vegetative cells are nearly as broad as high. The plant is monoecious. Each mature

sporocarp contains 32 carpospores in two tiers of sixteen, the formula being $32 (\frac{a}{2}, \frac{b}{4}, \frac{c}{4})$. Each mature antheridium contains 64 spermatia in four tiers of sixteen, the formula being $64 (\frac{a}{4}, \frac{b}{4}, \frac{c}{4})$.

Yendo (1916) regards the present species and *P. tenera* Kjellm. as one and the same species. Having now examined a good many specimens of this species, I agree with Professor Ueda in keeping these two distinct. The dentate characteristic of the present species seems to be constant enough. When Yendo made the remark: "Very often, however, we meet a form with absolutely entire margin, and thus losing the most important point to discriminate it from *P. leucosticta*," he probably had before him old specimens, the characteristic edges of which were already lost due to the disintegration of the fertile part. The number of carpospores in the sporocarps of these two species, as are already given above, is also different. So far as habit is concerned, this species is always orbiculate in shape whether young or old; *P. tenera* Kjellm., on the other hand, is elongate-ob lanceolate in the younger stages, a broad frond being attained only when old and mature. It seems, therefore, that we have two quite sharply defined species to deal with rather than merely growth forms of the same species as Yendo supposed.

HABITAT: On rocks in the littoral belt. Shek-O, Hong Kong, in March (*Tseng* 675); Swatow in March. Double Is., (*Tseng* 499) and Tong-hu (*Tseng* 540); Haitan I., Fukien, in March (*Tseng* 2115); Chushan Is.: Pooto I. (普陀山), in December (*Tseng* 1844) and East Saddle I., in June (*Tseng* 1515) and December (*Tseng* 1846).

DISTRIBUTION: Japan; Korea; Riukiu; China.

***Porphyra dentata* Kjellm.**

L.c., p. 13, pl. 1, fig. 7-8, pl. 3, fig. 1-4, pl. 5, fig. 8-13; Ueda, l.c., p. 19, pl. 1, fig. 9-10, pl. 3, fig. 6-13, pl. 13, fig. 3-4, pl. 14, fig. 1.

This species has been reported so far only from Pooto Island of the Chushan Islands (Chen and Kao, 1936). It is characterized by a microscopically dentate, monostromatic frond which is elongate-ovate with more or less orbiculate base, dioecious, having mature antheridium with as much as 128 spermatia, $128 (\frac{a}{4}, \frac{b}{4}, \frac{c}{8})$, and mature sporocarp with 16 carpospores, $16 (\frac{a}{2}, \frac{b}{2}, \frac{c}{4})$. When young, the frond is rather of an elongate, linear shape with approximately equal breadth throughout. Later on, growth in breadth is more active in the basal portion so that gradually a frond results which has a broader basal portion with orbicular base and is attenuate upward. Mature specimens in my collection attain a length of about 15 cm., and measure 2-3 cm. broad in the lower basal portion

and only $\frac{1}{2}$ -1 cm. in the upper one. The color of the frond varies from pinkish to dull purplish; generally, female plants are more pinkish and uniform in color while the male ones are duller purple with distinctly discolored margin owing to the presence of the numerous colorless spermatia. The thallus is thicker than those of the above two species, being usually 40-45 μ thick when fully mature. The cells are about $1\frac{1}{2}$ times as high as broad.

The present species is now found to be quite widely distributed on the southern part of our eastern coast, extending from the Chusan Islands on the Kiangsu-Chekiang border down to Amoy, Fukien. In Hinghwa District, Fukien, this is the "purple laver" of the market. Unlike the *Tsu-ts'au* of other coastal regions where it is usually marketed in thin, circular sheets, the purple laver of Hinghwa on the market is in the form of a stick about 1-2 cm. diam. and 12-16 cm. long. To prepare it for food, people there use scissors to cut the "stick" into small segments, which they drop into boiling peanut oil. The resulting *Tsu-ts'au* is then used as a condiment or eaten as a "vegetable." It is highly priced in this region where it costs from 2-3 dollars per catty.

HABITAT: On rocks in the littoral belts. Stevens I. (星嶼), Amoy, in March (*Tseng 1328*); Cheng-wu, Chuanchow, in April (*Tseng 1361*); Hinghwa, in January (*Tseng 1311*); Chushan Is., in December; Pootho I. (*Tseng 1843*) and East Saddle I. (*Tseng 1845*).

DISTRIBUTION. Japan; Korea; China.

Nemalion elminthoides (Valley) Batt. var. **vermiculare** (Suringar) comb. nov.

N. vermiculare Sur., Illustr. Alg. Jap. I, p. 91, pl. 54, 1872; Okamura, Icon. Jap. Alg. 4(2):28, pl. 158, fig. 1-16, 1916; Narita, Enumerat. Sp. Nemalion et Helminthoclad. Jap., p. 159, 1918

Nemalion vermiculare Sur. was established and distinguished from the European *N. elminthoides* (=*N. lubricum* Duby) by its author on the basis of two differences: (1) a much slenderer central strand and (2) less moniliform and more elongated assimilating cells. Okamura, i.c., in accepting the name of Suringar for the Japanese plant remarks that: "However, I can not help to doubt whether the plant should not be a local form of *N. lubricum*." Narita, i.c., makes a critical comparative study of the Japanese and European plants and concludes that (1) the relative size of the diameter of the central strand is very variable in both cases and cannot be used as a distinguishing character⁴ and that (2) the shape

⁴ "Careful observation on many specimens of both species from various localities has led me to conclude that the diameter of the axial part as well as the length of the assimilators are never constant as to put specific importance upon them. The axis has always the largest diameter in the lower part of frond, gradually decreasing upwards." (Narita, i.c.)

and diameter of the assimilating cells are fairly constant for each species and can thus be used for this purpose⁵.

What seems to be quite typical of Suringar's species has been collected from Hong Kong. This has the axial strand much smaller than the peripheral region and the assimilating cells cylindrical, only slightly constricted, about $5-7 \mu$ diam. and $12-15 \mu$ long. Those from Tsingtao and Weihaiwei are slightly different. These have the peripheral part comparatively smaller than the central strand and it is on this account that Grubb (1932) and Tseng and Li (1935) referred them to *N. elminthoides*. The assimilating cells are broader, about $8-9 \mu$ diam. and $11-15 \mu$ long, cylindrical and not moniliform. In spite of the differences, I feel quite sure that they belong to the same species. The minor differences are undoubtedly due to environmental factors since the Tsingtao and Weihaiwei plants were collected in the summer and seriously infected with *Clostridium parasitica* while the Hong Kong ones were collected in the spring and only slightly infected with the "parasite." I have studied some Japanese specimens of this species and have not the least doubt that ours is the same as the Japanese one. I have also studied a specimen of *N. lubricum* Duby from the French coast and found the same characteristic difference as already brought out by Narita, l.c. Therefore, it seems more reasonable to keep these two plants distinct, at least for the time being. However, the difference between these two is of rather a small degree and so I am inclined to treat the Asiatic plant as a variety under the earlier published European species.

The present species is monoecious. The antheridia and carpogonial branches are usually formed on different branches. Okamura, l.c., states that the plant is dioecious; in his fig. 4, l.c., however, he represents antheridia and the carpogonial branches together.

HABITAT: Shek-Oo, Hong Kong, in March to May (*Tseng* 325, 646); Yen-er-tao, Tsingtao, in July (*Tseng* 1544); Liu-kong-tao (劉公島), Weihaiwei, in August (*Tseng* 1656).

DISTRIBUTION: Japan; China.

Gelidium divaricatum Martens

Die Tange, p. 30, pl. 8, fig. 4, 1866; Tseng, Mar. Alg. fr. Amoy, p. 36, pl. 4, fig. 18, 1936.

The type locality of this alga is Hong Kong. Since its publication, however, it has never been reported from this locality. It is only reported, so far, from Amoy (Tseng, l.c.). It is now found to be very extensively distributed on the entire Chinese coast. Undoubtedly, it has escaped the notice of collectors because of its

⁵ "In *N. lubricum* Duby, the cells of the terminal parts of the assimilators are elliptical and moniliform and have larger diameter, measuring $9-15 \mu$; in *N. vermiculare* Sur., they are cylindrical, slightly constricted at the joints, and have the diameter of $6-11 \mu$." (Narita, l.c.).

small, inconspicuous frond. In spite of its small size, it has been extensively used for making home-made agar in Amoy and the Chushan Is.

HABITAT: Stanley Beach, Hong Kong, in March (*Tseng* 625); Kakjio, Swatow, in February-March (*Tseng* 562); Tungshan I., in July and September (*Tseng* 1151 and 2133); Niu-shan (牛山), Haitan I., in August (*Tseng* 2118); Chushan Is.: East Saddle I., in May-July (*Tseng* 1464, 1841, 1937), Kang-shan I., in June (*Tseng* 1963) and Side Saddle I., in August (*Tseng* 1985); Sa-tze-kou (沙子口), Tsingtao, in July (*Tseng* 1582); East Cliff, Weihaiwei, in August (*Tseng* 1689); Yan-tai-shan (烟台山), Chefoo, in July-August (*Tseng* 1624).

DISTRIBUTION: China; Japan.

Lomentaria hakodatensis Yendo

Nov. Alg. Jap. Dec. I-III, p. 6, no. 15, 1920.

L. sinensis Howe, Chin. Mar. Alg., p. 140, pl. 1, fig. 1, 1924; *Tseng* and Li, Mar. Alg. Tsingtao and Chefoo, p. 221, 1935.

Lomentaria sinensis Howe was described from a Chefoo specimen collected by Cowdry. It has been placed as a synonym of *L. hakodatensis* Yendo by Okamura in his "Manual of Japanese Marine Algae" (日本海藻誌), p. 684. With a view to checking this amalgamation, I sent my no. 1222 to the late Dr. Howe for his opinion. In this answer, Dr. Howe wrote: "You no. 1222 is my *Lomentaria sinensis*, which is apparently a synonym of *L. hakodatensis*, as already pointed out." A comparative study of our specimens of *L. sinensis* Howe and a Japanese specimen of *L. hakodatensis* Yendo, kindly presented me by Professor Y. Yamada, leaves no doubt in my mind as to the identity of the two.

This alga usually forms an entangled mass on various other algae, especially the *Sargassum*, in rock pools and it sometimes also grows as a low, pulvinate mass on rocks in the lower littoral belt. It is rather common on our northern coast extending from Tsingtao to Cheloo in the summer and early autumn. The thallus is very gelatinous. It is irregularly bipinnately branched, the branching being strictly monopodial. The internodes vary from 2-6 mm. long and 0.3-0.7 mm. diam. The thallus wall varies from 40-80 μ thick. Surface cells vary from 8-24 μ (mostly 16-20 μ) diam. in surface view. Mature tetrasporangia are about 60-80 μ diam. They are formed at the bottom of orbicular, oval or elliptical pits measuring to 300 μ wide or long. These are scattered in the ultimate ovoid-fusiform branchlets. Mature cystocarps are conical, about 500 μ high and 500-600 μ broad.

HABITAT: Yan-tai-shan and Pao-tai-shan, Chefoo, in July-August (*Tseng* 1222, 1392); Mau-tao-shan, Weihaiwei, in August (*Tseng* 1684); Tuantao (爛島), Tsingtao, in July-September (*Tseng* 1720, 2019).

DISTRIBUTION: Japan; China.

Dasya villosa Harv.

In "Lond. Jour. Bot. III, p. 433"; J. Agardh, Till Alg. Syst. XI, p. 163, 1891; Yendo, Alg. new to Jap V, p. 262, 1916; Grubb, Mar. Alg. Korea and China, p. 216, 1932.

D. pedicellata Tseng and Li (non C. Agardh), Mar. Alg. Tsingtao and Chefoo, p. 224, 1935.

When I identified the single, sterile specimen of *Dasya* collected by Dr. L. C. Li from Tsingtao (*Li A120*) as *D. pedicellata*, I was influenced by the records of this alga from Peitaiho and Chefoo by Collins (1919) and Howe (1924), respectively. At that time, however, I had some doubt as to the identification as Grubb, l.c., has also reported *D. villosa* Harv. from Peitaiho. Later, my stay in Tsingtao has enabled me to collect more materials of this alga and to study its various stages and fruits. Having re-examined my Amoy specimen which I have reported under *P. pedicellata* C. Ag. (Tseng, 1936) and compared it with the Tsingtao specimens, I come to the conclusion that these are different and that the Tsingtao material should be more properly referred to the present species. Further study of similar specimens from Weihaiwei, Chefoo, Peitaiho, and East Saddle L., shows that all these are the same as the Tsingtao plant. Although I am not able to study the specimens upon which Collins (1919) and Howe (1924) based their records of *D. pedicellata* for North China Coast, I am strongly inclined to think that they are nothing but the present species.

The year before last, I sent two of my specimens of this alga to the late Dr. Howe for his opinion with regards to this problem. In his reply, Dr. Howe wrote: "*Dasya pedicellata* and *D. villosa* are closely related and somewhat doubtfully distinct. *D. pedicellata* is usually of a more rose-red color, the cystocarps have perhaps longer pedicels, and the stichidia are more slender. Your Chefoo plants seem to me to have in common with *D. pedicellata*, yet is probably of the same species as the plant from Peitaiho that Miss Grubb has reported as *D. villosa*, though I express that opinion without having seen her plant. In case of doubt as to synonymy, *pedicellata* is, of course, the older name." Thus it is clear that Dr. Howe feels uncertain as to the distinctness of the two species. Miss Grubb has kindly given me a fragment of her plant upon which she bases her record of *D. villosa*. I have not the least doubt that my specimens are the same as hers.

Yendo has studied both type specimens of these two related species and in his "notes V," he makes the following remarks: "The point of distinction hitherto mentioned by the previous authors is on the stichidia. In *D. villosa* they are ovato-conical and mucronate while in *D. elegans* they are terminal and have no coordinate rauulets by them." With the abundance of materials available, both preserved and living, I found that the shape of the stichidia does not seem to be constant enough to warrant its being used as a

distinguishing character. However, I have found that their position in each case does seem rather constant and very useful for the differentiation. As already pointed out by Yendo in the case of *D. villosa*, the stichidia are sessile and have always coordinate ramulets. They are always terminated by a mucron which is not well developed in young stichidia but which elongates greatly to a long filament in older ones. In a few cases, I have found ramulets originating as an offshoot from the stichidia. All these show definitely that the stichidia of *D. villosa* are the modified lower portions of branchlets. *D. pedicellata*, on the other hand, has always stalked stichidia, not terminated with mucrons or filaments; they must, therefore, be the modified upper portions of transformed branchlets. Similar difference is also observed in the cystocarps. In the present species, these are also modified branchlets; there are always coordinate ramulets with them. *D. pedicellata*, on the other hand, has these on a long pedicel, being thus modified terminal portions of branchlets. I have not yet seen antheridial materials of these species, but I presume that they present similar cases.

The present species differs from *D. pedicellata* also in its duller color, the latter having usually a more rose-red one as pointed out by Howe. As regards ramification, no constant difference can be held for the distinction; Yendo, i.e., wrote: "The simpleness of ramification is never characteristic of *D. villosa*, as many of the authentic specimens of *D. villosa* are very much ramulose and some of *D. elegans* quite simple." In fact, my impression is that the branching of this species is very ramulose and simple ramification is found only in the older plants, especially in late autumn.

This species is very abundant on North China Coast in the summer and early autumn, during which period it is often one of the dominant species on rocks and stones or in rock pools in the littoral belt.

HABITAT: Peitaiho, in July (*C. Y. Chang* no. 14); Chefoo: Pao-tai-shan, in July-August (*Tseng* 1219, 1598; *Li A* 51) and Lau-yeh-shan (老嶺山), in August (*Tseng* 1243); Weihaiwei, in August: Light House (*Tseng* 1640) and Mau-tao-shan (*Tseng* 1688); Tsingtao: Yen-er-tao, in July (*Tseng* 1560) and Ta-kung-tao (大公島), in October (*Tseng* 1273); Hwei-chuan (灘泉), in July (*Li A* 120); East Saddle I., Chushan Is., in June-July (*Tseng* 1508 and 1981).

DISTRIBUTION: Australia, Tasmania; Japan, China.

Literature Cited

AGARDH, J. A.

1891. Till Algernes systematik. XI. *Lunds Univ. Arsskr.* vol. 26.
1895. Analecta algologica. *Contr.* III.

CHEN, C. S., AND KAO, T. P.

1936. *Porphyra* of Pooto. *Bull. Chekung Prov. Fish. Expt. Sta.* 2(6): 1-7. (In Chinese with English title and abstract.)

CHIAO, C. Y.

1933. Marine algae of Amoy. *Mar. Biol. Assoc. China, 2nd Ann. Rept.*, p. 121-168, 42 figs.

COLLINS, F. S.

1919. Chinese marine algae *Rhodora (Jour. New Eng. Bot. Club)* 21 (251) 203-207

COTTON, A. D.

1915. Some Chinese marine algae. *Kew Bull. Misc. Inform.* 3 :107-113.

COWDRY, N. H.

1922. Algae in Plants of Peitaiho. *Jour. N. China Br. Roy. Asia. Soc.* 53 :180-181.

DEBEAUX, O.

1875. Algues marines recoltees en Chine pendant l'expedition-francaise de 1861-1862. *Actes Soc. Linn. Bordeaux* 30 :41-56.

GRUBB, V. M.

1932. Marine algae of Korea and China, with notes on the distribution of Chinese marine algae. *Jour. Bot.* 70(836) :213-219; (837) :245-231.

HOWE, M. A.

1924 Chinese marine algae. *Bull. Torrey Bot. Club* 51(4) :133-144

HUS, C. T. A.

1902 An account of the species of *Porphyra* found in the Pacific coast of North America. *Proc. Calif. Acad. Sci., 3rd ser.*, 2(6) :73-236, pl. 20-22.

KJELLMAN, F. S.

1897. Japanska arter af slæget *Porphyra*. *Bih. Till K. Sv. Vet. Akad. Handl. Bd.* 23, af. 3, no. 4.

MARTENS, G. V.

1876 Die Tange. Die preussische expedition nach Ost-Asien. Botanischer Theil.

NARITA, S.

1918 Enumeratio specierum *Nemalionis* et *Helminthocladiae* Japonicæ. *Tokyo Bot. Mag.* 32 :189-199, pl. 4.

OKAMURA, K. (岡村金太郎)

1897. On the algae from Ogasawara-jima (Bonin Island). *Tokyo Bot. Mag.* 11(119) :1-16, pl. 1.

1907 1935. Icones of Japanese algae. Vol. 1, no. 3 (1907); vol. 4, no. 2 (1916); vol. 5, no. 10 (1928); vol. 7, no. 7 (1935).

1936. [Manual of Japanese marine algae] 日本海藻誌 (In Japanese.)

SEYCHELL, W. A. AND GARDNER, N. L.

1925. The marine algae of the Pacific coast of North America. *Univ. Calif. Publ. Bot.* 8(2) :139-374, pl. 9-33.

SURINGAR, W. F. R.

1872-1874. Illustration des algues du Japon. *Mus. Bot. Leide* 1 :63-79, pl. 1-13, 2 :1-15, pl. 15-22.

TILDEN, J. E.

1929. The marine and freshwater algae of China. *Ling. Sci. Jour.* 7 . 349-398, pl. 13.

TSENG, C. K.

1933. *Gloiopektis* and the other economic seaweeds of Amoy. *Ling. Sci. Jour.* 12(1) :48-63, pl. 2-3.
1935. Economic seaweeds of Kwangtung Province, S. China. *Ling. Sci. Jour.* 14(1) :93-104, pl. 1, 2.
1936. Notes on the marine algae from Amoy. *Amoy Mar. Biol. Bull.* 1(1) :1-86, pl. 1-6.

TSENG, C. K., AND LI, L. C.

1935. Some marine algae from Tsingtao and Chefoo, Shantung. *Bull. Fan Mem. Inst. Biol. (Bot.)* 6(4) :183-235, 2 maps.

UEDA, S. (植田三郎)

1931. [Studies on the Japanese species of *Porphyra*] 日本產アマノリ属
ノ分類學的研究 [Jour. Fish. Expt. Sta. vol 28] 水產研究所研
究報告 24 卷 (In Japanese.)

WITTRICK, V. B.

1866. Forsok till en monographi ofver alsglagtet *Monostroma*.

YAMADA, Y.

1925. Studien ueber die Meerestalggen von der Insel. Formosa I. Chlorophyceae *Tokyo Bot Mag* 39(460) :77-95
1934. The marine Chlorophyceae from Ryukyu, especially from the vicinity of Nawa. *Jour. Fac. Sci. Hokkaido Imp. Univ.*, ser. V, 3(2) .33-88.

YENDO, K.

1916. Notes on algae new to Japan IV. *Tokyo Bot. Mag* 30(350) 47-65; V *ibid.* 30(355) :243-263
- 1920 Novae Algae Japoniae. Deas I-III. *Tokyo Bot. Mag.* 34(397) : 1-12

中國海藻誌要

曾呈奎著

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(摘要)

中國海藻之名錄迄今有三即：柯令士氏 (1919)，鐵爾頓氏 (1929)，及葛拉白氏 (1932) 所編者。在此數名錄中，有不少遺漏之處。本文作者研究之過程中，時有所發現者。中國海藻現約三百種，其中有定名錯誤者亦有需更改學名者。又有若干中國海藻本只見於一二處現則知其分佈甚廣。此數種海藻雖已經前人報告自國，但因有上述諸原因，作者認為有重新報告之價值，故而有本文之作。本文現所討論者計有十二種。

A NEW SPECIES OF CESTODE OF THE FAMILY
ANOPLOCEPHALIDAE (CESTODA) FROM TAPIRA

By T. G. CHIN (金德群)*

Anoplocephala tapirus n. sp. (pl. 26)

The worm is from 80 to 112 mm. in length, consisting of more than one hundred proglottides, and is 8 mm. in greatest width. The scolex is $672\ \mu$ in diameter and $320\ \mu$ in height, unarmed, without a rostellum, and provided with four suckers each about $300\ \mu$ in diameter. The neck region is apparently absent. The posterior margin of the proglottides is distinctly wider than the anterior margin of the next adjoining proglottide. All proglottides are wider than long. Two pairs of longitudinal excretory vessels are distinct, the inner pair being larger. Genital pores are unilateral.

Beginning from about the eighth segment the cirrus pouch is gradually developed. From about the fifteenth segment testes also appear. In about the twentieth segment the ovary becomes visible. At about the twenty-fifth segment practically all important parts of the reproductive system are seen. However, the mature segments begin at about segment number thirty. The uterus becomes better and better developed toward the posterior, while other parts, such as the cirrus and ovary, soon become progressively reduced.

MATURE SEGMENTS: In the male reproductive system the testes are numerous and are scattered between the two inner longitudinal excretory canals and are mostly on the aporal side. The vasa efferentia are small and can hardly be seen. A vas deferens starts from the middle on the aporal side, runs transversely above the ovary and coils once in the form of an "e". The cirrus pouch is about $600\ \mu$ in length, containing a slightly curved and coiled cirrus, which generally protrudes out of the genital papilla, as a whip. The genital papilla is large and projects out conspicuously.

The female genital opening is posterior to the male opening, and is not easily distinguished. The vagina is a large thin-walled tube, very easily seen in a newly matured proglottide, but is covered by the cirrus pouch and other organs in older proglottides. The seminal receptacle is large, almost spherical, and situated at the lower center of the proglottide, becoming gradually elongated when the proglottide becomes older. The vitellaria are on the aporal side of the seminal receptacle and are a little irregular in the margin. The ovary is divided into many branches and is arranged in a half-moon shape, measuring about $200 \times 250\ \mu$, situated just above the seminal

* Contribution from the Department of Biology, Lingnan University, Canton. The writer wishes to thank Dr. H. T. Chen, for many helpful suggestions in the study.

receptacle and the vitellaria. The shell gland is not distinct. The uterus is a transverse tube above the ovary, with many pocket-like extensions going anteriad and posteriad (pl. 26, fig. 3).

THE RIPE SEGMENTS: The organs in the ripe segments are all degenerated except the uterus. The uterus is a transversely elongated sac, with many pocket-like extensions toward the anterior and posterior. Eggs are numerous, oval, $48 \times 28 \mu$ in size, the internal structures not distinct in the preserved material.

HOST: *Tapirus americanus* L. This animal was imported from the Philippines and died as a result of the cold weather at Amoy, in January of 1933.

LOCATION: Small intestine. Numerous parasites were obtained.

TYPE SPECIMEN: Department of Biology, Lingnan University.

COTYPE SPECIMEN: Department of Biology, the National University of Amoy, Amoy.

REMARKS: The present species is somewhat like *Anoplocephala mamillana* (Mehlis, 1831), but there are several differences: (1) *A. mamillana* is only 6-50 mm. in length and 4-6 mm. in maximum width, while the present species is 80-112 mm. in length and 7-8 mm. in width; (2) The suckers have longitudinal slits in *A. mamillana*, while no such slits are found in the present species; (3) The ova of *A. mamillana* are $88 \times 50-66 \mu$ in size, while those of the present species are smaller, $48 \times 28 \mu$.

References

BAYLIS, H. A.

1928. A manual of helminthology. ix+303 p. William Wood and Company, New York.

DOUTHITT, HERMAN

1915. Studies on the cestode family Anoplocephalidae. *Ill. Biol. Monographs* 1(3):5-96.

LEWIS, E. A.

1926. Helminthes collected from horses in the Aberystwyth Area. *Jour. Helminth.* 4(4):179-182.

SANDGROUND, J. H.

1933. Two new helminthes from *Rhinoceros sondaicus*. *Jour. Parasit.* 19:197.

貘之一新條蟲(條蟲 Anoplocephalidae)

金德群著

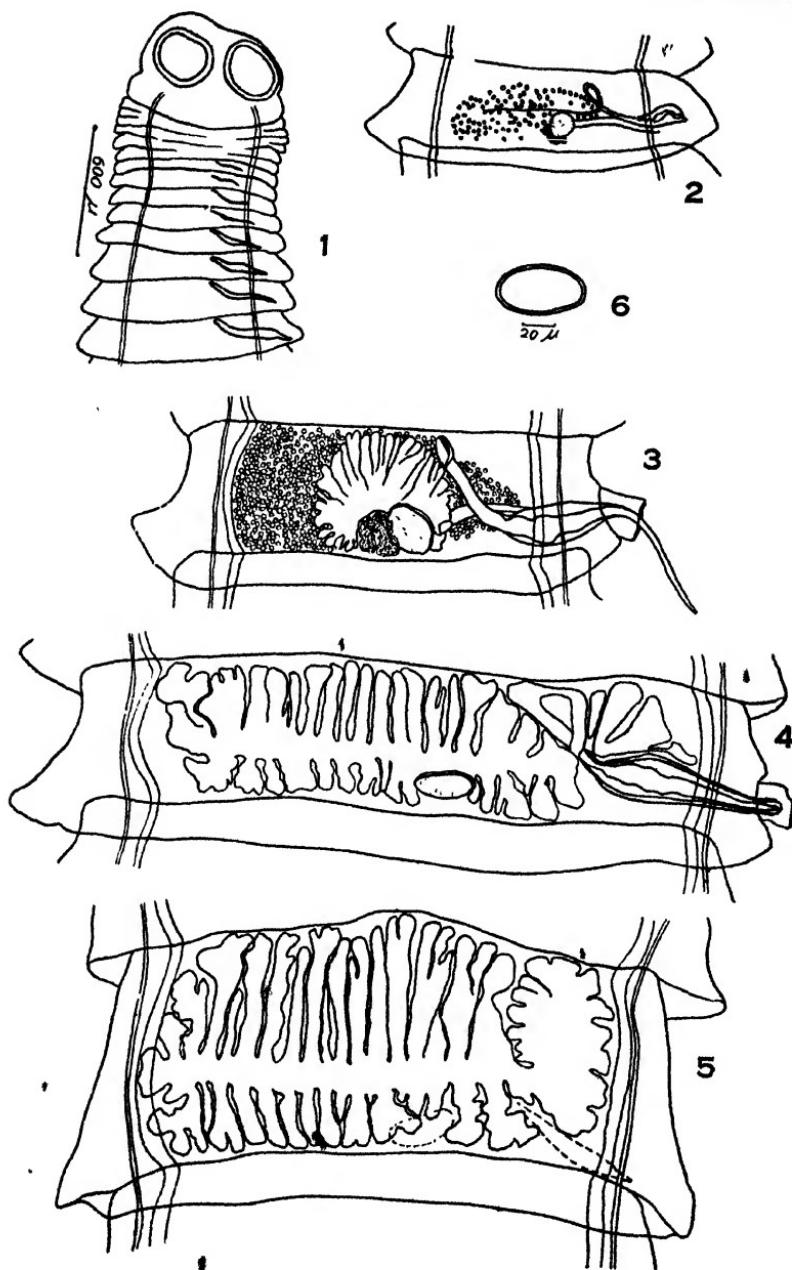
(摘要)

本文論及之新條蟲(*Anoplocephala tapirus*)，乃見由菲律賓輸入之美洲貘(*Tapirus americanus* L.)之小腸中，此新種與*Anoplocephala mamillana* (Mehlis)相類似。

Explanation of Plate

(All camera lucida drawings. Scales for fig. 1-5 are the same.)

- Fig. 1. Scolex of *Anoplocephala tapirus* n. sp.
2. Twenty-fifth segment, showing the well-developed testes and the beginning of ovary, etc.
 3. Mature segment.
 4. Gravid segment, younger.
 5. Gravid segment, older.
 6. Ovum.



**GEOGRAPHICAL DISTRIBUTION
OF
ACER (SECTION INTEGRIFOLIA PAX)
IN CHINA**

By FRANKLIN P. METCALF

Curator of Herbarium,

Lingnan Natural History Survey and Museum.

In 1932¹ the writer published an article on this section. One additional species, *Acer decandrum*, in this group was described from Hainan by Merrill² about six weeks before, after my manuscript had been mailed to China. About the same time Chun³ published another new species in this group, *Acer cyclopseoides*. Also about the same time, Fang⁴ published his first paper on this interesting group. Subsequently, the writer⁵ published a short scientific note. Fang⁶ more recently has published additional notes, disagreeing with me in regard to some species but concurring with my interpretation in other cases. No additional remarks in regard to the different interpretations is here intended, except where it influences the distribution of a given species or variety. In the one or two species where the lines of demarkation as to specific or varietal status is still a matter of question that group will be treated as a unit for distributional purposes.

The purpose of this paper is to try to throw some light on the actual phytogeographical relationship, if any, in this group of very closely related species.

In order to obtain a bird's-eye view of the group as a whole the accompanying table (pl. 27) is given, arranged according to provinces but in such a way that the evident relationship is most easily expressed. For example, after my intensive study of the flora in Fukien and SE. China I have no doubt that Kwangtung, Fukien, southern Chekiang, and southern Kiangsi represent a decided geographical unit. Possibly, to that Kiangsi may be added, but I feel that the relationship between Kiangsi and Kweichow-Yunnan

¹ Metcalf, F. P. : *Acer (Section Integritolia Pax) for Southeastern China.* *Ling. Sci. Jour.* 11(2) :193-210, tab. 3, fig. 1-5, 1932.

² Merrill, E. D. : A Fourth Supplementary List of Hainan Plants. *Ling. Sci. Jour.* 11(1) :47-48, 1932.

³ Chun, W. Y. : Hook. Ic. Pl. t. 3160, 1932.

⁴ Fang, W. P. : Preliminary Notes on Chinese Aceraceae. *Contrib. Biol. Lab. Sci. Soc. China* 7(6) :143-188, fig. 1, 1932.

⁵ Metcalf, F. P. : Notes on Fang's Chinese Aceraceae. *Ling. Sci. Jour.* 12(1) :135-136, 1933.

⁶ Fang, W. P. : Further Notes on Chinese Aceraceae. *Contrib. Biol. Lab. Sci. China* 8(2) :162-182, fig. 7-8, 1932.

is as close, if not closer, than Kwangsi to Kwangtung. Northern Chekiang, northern Kiangsi, Hunan and Anhwei represent a decidedly different, more distinctly northern, element.

I first arranged the list of species and distribution with the purpose of placing the Southeast and Southwest groups nearest to each other, but this resulted in having the North and Northwest groups at opposite ends of a lineal list, so a circle was finally worked out; I believe it brings out the relationships much better than the lineal list arrangement. It also gives at a glance a bird's-eye view of the whole distribution and I believe will be an improvement on the usual list arrangement, which despite everything does separate to the upper and lower part of the paper some closely related groups.

A glance at this chart will show at once that the section *Integritolia* Pax of *Acer* represents a part of the genus *Acer* that is decidedly western and southern in distribution—in fact, in the whole group only one species is distinctly northern, *A. discolor* (Kansu and Shensi), and only one other is reported from the north by Fang, namely, *A. oblongum* Wallich (Shensi). Aside from these two species we have then a group which is completely lacking from the northwestern tier of provinces—Kansu, Tibet, Mongolia, Shensi—and the northeastern tier—Shansi, Manchuria, Hopei, Shantung, Honan, Kiangsu. The section *Integritolia* has two centers of distribution, namely, the southwest provinces, Szechwan, Yunnan, Kweichow, and Hupeh, and the southeast group of Kwangsi, Kwangtung, Fukien, Chekiang. The provinces of Hunan, Kiangsi and Anhwei are poorly represented with only one species each, respectively, *oblongum*, *Fabri* and *cordatum*, all widely distributed species. *A. oblongum* and *A. Fabri* have the widest distribution of all. The most restricted distribution is that of *A. coriaceifolium* (Kweichow only), *sycopseoides* and *lanceolatum* (Kwangsi only), *lucidum*, *decandrum*, and *reticulatum* (Kwangtung only) and *sino-oblongum* (Kwangtung and Formosa only). The largest number of endemic species is located in Kwangtung and Kwangsi. The flora of Kwangsi is still very inadequately known, many of the Kwangtung species will undoubtedly be found later in Kwangsi. The largest number of species, nine from Kwangtung as compared with six from Hupeh and five each from Chekiang, Fukien, and Szechwan (each of these including some varieties), shows that at present Kwangtung may be considered as the center of distribution of the section *Integritolia*, being strongly represented both in endemic forms and in those species that are more western in distribution (*laevigatum*, *Fabri* and *oblongum*) and also more eastern in distribution (as *cinnamomifolium*, and *cordatum*).

Additional exploration in Kwangsi and Fukien will surely show a closer relationship to Kwangtung, and may bring to light other species which are somewhat related to the southwest—Yunnan and Szechwan.

Another interesting feature of this geographical distribution is the relation of some southwestern species to India, which is to be expected, but also the evident close relationship of some of the western species and varieties with Formosa and the number of endemic forms in Formosa (*hypoleucum*, *albo-purpurascens*, and *litseaefolium*), which are definitely in the *Integrifolia* group and closely related to *A. sino-oblongum* Metcalf.

List of *Acer* Species and Their Distribution¹

cinnamomifolium Hayata

Fukien !, Kwangtung !, Chekiang !, Kwangsi, Kweichow ?

lanceolatum Molliard

Kwangsi.

lucidum Metcalf

Kwangtung !

coriaceifolia Léveillé.

Kweichow.

sycopseoides Chun

Kwangsi ! [Hook. Ic. Pl. t. 3160, 1932; and Fang 8(2):172, 1932.]

decandrum Merrill

Kwangtung (Hainan) ! [Merrill, Ling. Sci. Jour. 11(1):47, 1932.]

hypoleucum Hayata

Formosa.

litseaefolium Hayata

Formosa.

sino-oblongum Metcalf

Kwangtung (Hongkong), Formosa. ?

reticulatum Champion

Kwangtung (Hong Kong) !, not Kwangsi as reported by Metcalf in Ling. Sci. Jour. 11(2): 209, 1932. [Fang: 8(2): 173, Dec. 1932].

cordatum Pax

Hupeh, Kwangtung !, Fukien !, Chekiang !, Anhwei !

The following closely related varieties and species are separately treated :

cordatum Pax. var. **microcordatum** Metcalf

Considered syn. of *A. cordatum* Pax. by Fang, [see 8(2):174, 1932]. Probably Fang is right.

Fukien !, Chekiang !, and Kwangtung ?

¹ Records refer to those listed in my *Acer* article (see footnote on 1); the references for other sources have been added.

² (!) means this species is represented in Lingnan University collection.

cordatum var. **subtrinervium** (Metcalf) Feng.

A. subtrinervium Metcalf, Ling. Sci. Jour. 11(2): 200, May 1932.

Fukien! and Chekiang! only.

dimorphifolium Metcalf

Fang considers this a synonym of *A. cordatum* Pax but I still doubt his interpretation.

Fukien only.

laevigatum Wallich.

Hupeh, Szechwan!, Kwangtung (Hong Kong), Yunnan, and also Kweichow [Fang, 7(6): 170-171, (1932)], India, not Kwangsi [see Fang 8(2): 173, (1932)].

Fabri Hance (also including the new var. *virescens* Fang from Kwangsi).

(Syns: *A. Fargesii* Franchet apud Rehder; *A. Fabri* Hance var. *rubro-carpum* Metcalf, see explanation by Fang 8(2): 173, 1932.)

I believe *A. salweenense* W. W. Smith may belong here (*Rock 10112*, Yunnan.)

Kwangtung!, Kwangsi!, Szechwan, Hupeh, Kiangsi!, Kweichow!

oblongum Wallich ex DC.

Yunnan, Hupeh, Hunan, Szechwan!, Kweichow!, Shensi, Kwangtung, Chekiang, and India [Fang 7(6): 168, May 1932], and not Fukien as reported. [see 8(2): 171, Dec 1932]. Fang also reports this from Formosa about which I am not sure, and also reports it (under *A. oblongum* var. *macrocarpum* Hu) from Kwangsi but this, as Fang admits later, is really *Acer cinnamomifolium* Hayata.

var. **biaruetum** W. W. Smith

Yunnan, Szechwan.

var. **concolor** Pax.

Hupeh, Szechwan!

var. **Itoanum** Hayata

Loochoo (near Formosa).

var. **latialatum** Pax.

Hupeh.

var. **microcarpum** Hieronymus

India (Bengal).

discolor Maxim.

Shensi and Kansu [Forbes and Hemsley Enum. China. 23: 140 1886].

Note: This MSS. was prepared in July 1936, and was originally submitted for publication to a Fukien periodical. The original plate was destroyed in 1937 during the fighting at Shanghai, so the MSS. was therefore withdrawn from publication. A new plate has just now been prepared, but after the first experience it was thought unwise to again risk its loss or destruction by resubmitting to Foochow.

中國槭樹屬全緣葉亞屬之地理分佈

麥克福著

嶺南大學自然博物採集所植物標本室主任

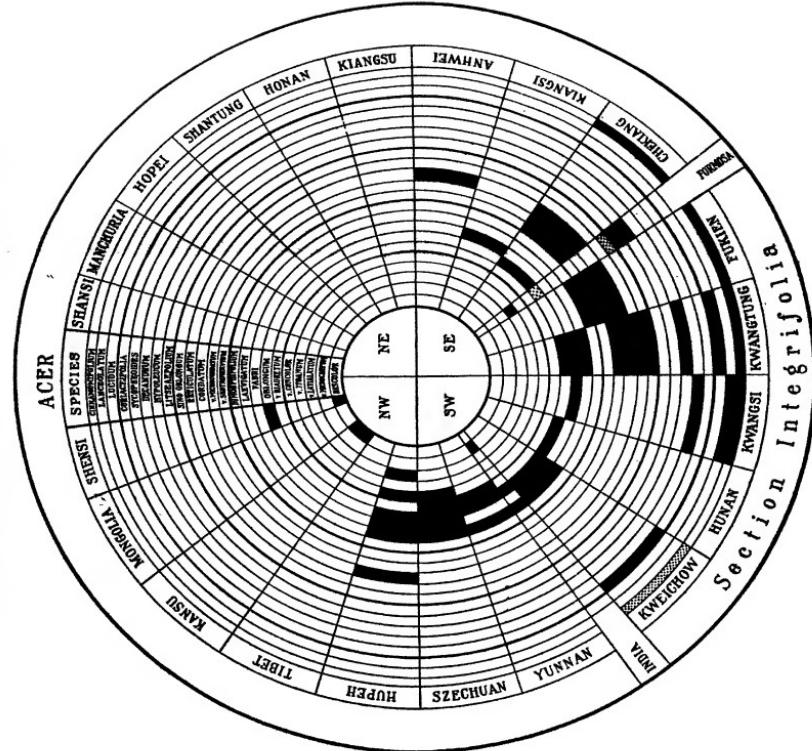
(摘要)

本亞屬之中國槭樹除一二種外均限於西，南部。其分佈之區域可分之為二：西南區，內包四川，雲南，貴州，湖北諸省，及東南區內包廣東，廣西，福建，浙江諸省。此二區域之中心則為廣東，其本亞屬槭樹共九種，其他各省則一至五，六種不等。為使讀者對於此亞屬分佈之情形得有較確實之認識，作者將此亞屬之各該種的分佈表之於圓形表格，蓋作者認為此圓形表格在表示各種之分佈情形上，實較優於植物學者素常所用之直排表格也。

Explanation of Plate

Species definitely reported are shown by black spaces.

Species reported, but questionable or not authenticated, are shown with dots.



A NEW RHAMNUS FROM KWANGTUNG¹

By FRANKLIN P. METCALF

Curator of Herbarium, Botanical Survey, Lingnan University.

Rhamnus fulvo-tinctus sp. nov. (pl. 28)

Frutex erectus, circiter 2.5 m. altus, glaber, imerme, ramis cinerobrunneis, remulis atro-brunneis, et minuto-pubescentibus; foliis alternis, ellipticis vel lanceolatis, 5-6 cm. longis et 1.5-2.2 cm. latis, acuminatis, basi cuneatis, supra atro-brunneis, glaber, subtus pallidioribus; nervis primariis utriusque 4-5, supra inconspicuosis, subtus perspicuis; margine integris, subrevolutis; petiolo 3-4 mm. longo, glabro vel minute-puberulo; fructibus axillaribus, 1-2 (3-4), globosis vel obovoidis, glabris circiter 6 mm. longis et 5-6 mm. latis, pedicellis 8-10 mm. longis, sub-filiformis, pubescentibus; calycibus persistentibus, disciformibus. Seminibus 5.5 mm. longis, glabris.

A small glabrous unarmed shrub up to 2.5 m. high; branches pale greyish-brown, branchlets darker almost blackish-brown and minutely puberulent; leaves alternate, typically elliptic to lanceolate-elliptic, 5-6 cm. long and 1.5-2.2 cm. wide, apex acuminate, base cuneate, dark blackish-brown above (when dry), glabrous, paler beneath; primary nerves, 4-5 on each side of the midrib, inconspicuous above, but rather prominent below; margins entire but often noticeably revolute; petiole 3-4 mm. long, glabrous or minutely puberulent; fruits 1-2, rarely 3 to 4 in each axil, globose to ovoid, glabrous, distinctly grooved, about 6 mm. long and 5-6 mm. wide, crowned with base of persistant style: pedicels slender, subfiliform, 8-10 mm. long, puberulent, as well as persistant disciform calyx. Seeds 5.5 mm. long. smooth.

Kwangtung: Yang Shan and vicinity, Yang-Shan District, T. M. Tsui 443, (type) July-Sept., 1932; Tsang 27770 from Lung-mu-an, Hai-Yang-Ping, Kweilin, Kwangsi, collected July 7, 1937, represents the same species. The leaves are consistantly shorter and wider, but otherwise appear to be the same.

This plant, especially the leaves, contains a volatile dye, as the newspaper folders enclosing the material, as well as the white herbarium sheets are dyed a very distinct yellowish-brown.

Other species of *Rhamnus* here available apparently also have dye properties. Some sheets of *R. utilis* Decne stained the herbarium sheets and genus folders a pale pinkish-brown (FCU. 15332 & 7585 from Foochow), and *Rhamnus* sp., apparently an undescribed new species from Sam Kak Shan (Tsang 20452), also gives a pale yellowish color to the herbarium sheets.

¹ Contribution from the Botanical Survey, formerly a part of Lingnan Natural History Survey & Museum.

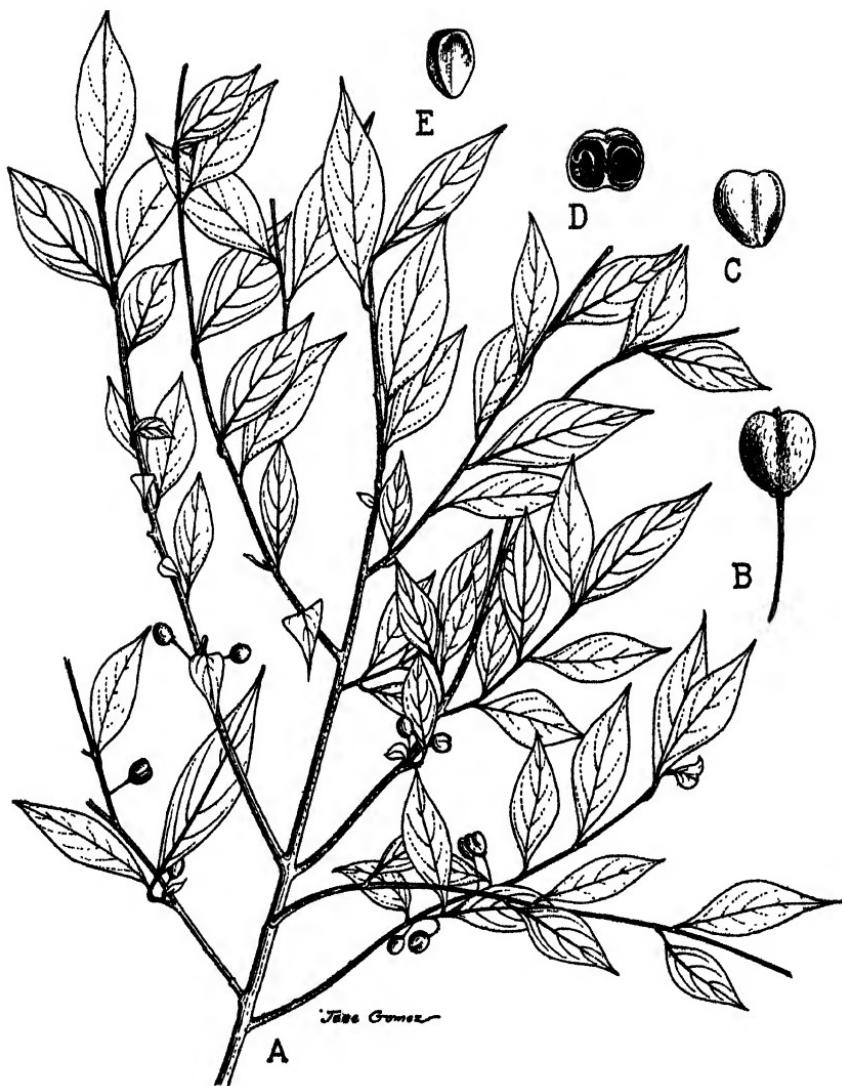
廣東一種新鼠李屬植物

麥克福著

嶺南大學植物館植物標本室主任

(摘要)

本文所載之新種 *Rhamnus fulvo-tinctus* Metcalf 係一九三二年七至九月間採自廣東省陽山縣（模型號：Tsui 443）。此外尚有本室採集員曾君，一九三七年七月七日在廣西省桂林海陽坪之龍母庵所採得之一鼠李屬植物（Tsang 27770），亦經作者斷定同屬此新種，雖後者之葉較前者稍短而寬。本種之一甚顯然的特徵為其俱有黃褐色之染料，故標本紙之與其接觸者均呈有該標本之黃褐色的模形。

*Rhamnus fulvo-tinctus* Metcalf sp. nov.

Tsui 443, type from Yang-Shan, Kwangtung. A. Branches with fruits, $\times 4$. B. Fruit showing pedicel, persistent calyx and base of persistent style, $\times 1.6$. C. Fruit with outside coats removed, $\times 1.6$. D. Cross section of fruit, $\times 1.6$. E. Single seed, $\times 1.6$.

A CRYSTALLINE COMPOUND FROM THE WHITE POWDER FOUND ON BAMBUSA CHUNGII

By F. C. CHANG (曾朝明)

Department of Chemistry, Lingnan University, Canton, China.

On many bamboos is found a white powder which appears on the first year culms and is apparently related in some way to the development of the shoot into the adult plant. Two species of bamboo found in South China, recently described as new by McClure (*Ling. Sci. Jour.* 15(4):639), have such an abundance of white powder that that author considers the copiousness of the powder a characteristic of these species. So far as can be discovered, no work on this powder has been published in the literature. The only reference which the writer has been able to find, to chemical work on a bamboo surface product, reads: "A gummy manna found on bamboo in Java proved to be largely melicitose" (*C. A.* 21, 1291). The present investigation was begun in order to study the chemical nature of the powder found on *Bambusa Chungii* McClure, one of the species which has an abundance of powder.

The white powder from *Bambusa Chungii* is a mixture. One component, which is crystalline, is present to the extent of about 25%. This paper describes the isolation of this crystalline substance, and is a preliminary report on its identification. It was felt desirable to publish a full record of results so far obtained even though the identification is not conclusive, because the work has been interrupted by circumstances beyond the writer's control. It is hoped, however, that work can be resumed soon, perhaps at another laboratory, both to fully identify this crystalline compound, and to study the other components of the powder.

The powder may be removed from the culms by scraping, and when it is extracted with commercial alcohol in the cold, a residue is left which can be taken up with benzene. When this benzene solution is concentrated and a small amount of alcohol is added, a crystalline material comes out of the solution on cooling. This crystalline substance (A) is purified by repeated recrystallization out of benzene and alcohol, and finally out of carbon tetrachloride and alcohol. The final melting point is 245-254°C. (uncor.). Melting is accompanied by partial decomposition. A is insoluble in water, slightly soluble in hot commercial alcohol, not soluble in dil. sodium hydroxide or hydrochloric acid, fairly soluble in benzene, ether, ethyl acetate, methanol, pyridine, naphthalene, xylene, glacial acetic acid, more soluble in chloroform and carbon tetrachloride, and cold conc. sulfuric acid.

Heating at 110° gives no appreciable loss of weight, but A can be sublimed at atmospheric pressure above 190°. Upon reducing the pressure to 2 mm., it undergoes slow sublimation even at 110°; at 190° decomposition accompanies sublimation.

Molecular weight determinations by the Rast method gave an approximate figure of 296, and by the ordinary cryoscopic method using benzene as solvent, gave 350.

Qualitative analyses for the elements indicate the absence of nitrogen, halogens and sulfur.

Quantitative analysis results are given in the experimental section.

A is laevo-rotatory. Determinations done on a saccharimeter which can give only approximate results indicate a specific rotation of -16. It may be mentioned incidentally, that the cold alcohol extract of the original powder has a positive rotation.

Discussion

A study of the properties of this crystalline compound suggested the possibility of its being related to the sterols which are found on other plants oftentimes in a form not unlike this bamboo powder. The response to the Lieberman-Burchard test of the recrystallized compound lends support to this theory, although the melting point does not fall into the range given by known sterols. Upon purification of the compound by preparation of the oxime and subsequent hydrolysis of the oxime, however, a product is obtained which does not give the sterol test. It is felt now that the compound is another of the triterpenoid compounds, some of which, as for instance lupeol, were at one time classified as sterols. (*Jour. Chem. Soc.* 1922 A, i, 826). Although the evidence on hand does not definitely establish the identity of the compound, sufficient similarity has been noted to indicate that it is either identical to freidelin, the crystalline compound extracted from cork, and recently demonstrated to be a triterpenoid ketone by Drake and his co-workers (*J.A.C.S.* 57, 1570; 57, 1854); or it is a new compound closely related to freidelin. It should not be difficult to establish this point when work is resumed, by preparing more derivatives of the compound. Two derivatives, one formed with acetyl chloride, and the other with hydrochloric acid have not been studied. It is expected that a study of these will yield interesting results.

Experimental

Isolation of Crystalline A.—45 gm. of the powder is shaken with 300 cc. of cold commercial alcohol and allowed to stand overnight, and filtered. (The filtrate, which was found to be dextro-rotatory, is not reported on further in this paper.) The residue is treated with 150 cc. of boiling benzene, and filtered while hot. The benzene filtrate is concentrated to about 75 cc. and crystals separate

on cooling. These crystals are filtered off. Further concentration of the mother liquor yields a second crop of crystals which are colored slightly yellow. The combined yield is about 11 gm. The melting point of the first crystals is 215-232°. Recrystallization out of carbon tetrachloride and alcohol, after boiling with decolorizing charcoal, gives a product which melts at 246-254°, and comes out in long, needle-like crystals (see plate, fig. 1). The melting point determinations were taken in capillary melting point tubes which were introduced into the bath at 200°.

Molecular Weight Determinations.—By the Rast method, 0.0509 gm. of A lowered the melting point of 0.5290 gm. of camphor 13 degrees.

$$\text{M.W. : } 40 \times \frac{.0509}{.5290} \times \frac{1000}{13} = 296$$

By the Beckmann cryoscopic method, 0.2325 gm. of A lowered the freezing point of 33.8335 gm. of benzene 0.100 degrees.

$$\text{M.W. : } 5.10 \times \frac{.2325}{33.84} \times \frac{1000}{.100} = 350$$

Carbon and Hydrogen Determinations (macro).—

	Sample used	CO ₂ obtained	H ₂ O obtained	%C	%H
No. 1	0.1662 gm.	0.5102 gm.	0.1678 gm.	83.71	11.29
No. 2	0.1322	0.4064	0.1338	83.85	11.32
No. 3	0.1000	0.3121	0.1066	85.12	11.93
No. 4	0.1242	0.3766	0.1302	82.70	11.73

The last two analyses were done in the spring when climatic conditions in Canton are least favorable for quantitative analysis, so that checks on the earlier results obtained were not available.

Preparation of Oxime.—0.70 gm. of A is added to 40 cc. of benzene and 10 cc. of comm. alcohol, to which is added 0.3 gm. of hydroxylamine hydrochloride in 10 cc. of alcohol, and 0.3 gm. of sodium hydroxide in 10 cc. of alcohol. After refluxing for one hour, the homogeneous solution is concentrated down to half its volume, when crystals separate. The melting point of the crystals after recrystallization from alcohol and ethyl acetate was 285-288°. This product gave a positive qualitative test for nitrogen, and comes out of benzene in hexagonal crystals.

Hydrolysis of Oxime.—Hydrolysis of the oxime according to the method used by Drake (*J. A. C. S.* 57, 1854) using phosphoric acid and n-amyl alcohol, yielded a substance with a crystalline form identical with that of the original substance, but with melting point 250-256°. This form does not give the Leiberman-Burchard test, indicating that the original substance contained an impurity which may be a sterol and which is removed by this method of purification.

Preparation of the Oxime Acetate.—0.1 gm. of the oxime is treated with 10 cc. of acetic anhydride for one half hour, cooled, and

poured into 100 cc. of water. Crystals separate out and are collected and recrystallized from ethyl acetate and alcohol. The final melting point obtained was 220-221°.

Preparation of the 2,4 Dinitrophenylhydrazone.—0.25 gm. of A is dissolved in 30 cc. of 1,4 dioxane, 0.15 gm. of 1,4 dinitrophenylhydrazine added, and the solution warmed. 2 drops of conc. hydrochloric acid are added, and the solution is boiled for 10 minutes. One-half the dioxane is evaporated off, and alcohol added. Crystals separate on cooling which on recrystallization out of absolute alcohol, have a melting point of 238-240° with decomposition. (The dinitrophenylhydrazine was synthesized by a student, and was used before the purity could be checked.) The product may only be the original A contaminated with some of the hydrazone formed.

Preparation of the Acetyl Chloride Derivative.—0.1 gm. of A is refluxed with 10 cc. of acetyl chloride for one hour. Water is added gradually to hydrolyse the excess chloride, and the insoluble material separates. Recrystallization out of benzene gives a crystalline product in the form of shiny hexagonal plates. (See plate, fig. 2). The melting point of this product is well above 260°.

Preparation of the Hydrochloric Acid Derivative.—When A is heated for one hour with 10% hydrochloric acid, a small amount of a soluble product is formed which comes out of solution in octahedral crystals which the polarizing microscope shows to be isotropic (see plate, fig. 3).

The conditions for the foregoing experiments, and the quantities of materials used, are those used by the writer and no claims are made that they are optimum conditions. The experiments in which the oxime, oxime acetate, and dinitrophenylhydrazone were prepared, and the oxime hydrolysed, were suggested by the paper of Drake (*J.A.C.S.* 57, 1854).

Summary

A crystalline compound has been isolated from the white powder found on a bamboo of South China, *Bambusa Chungii* McClure.

The properties of the compound indicate that it is a triterpenoid ketone, either identical with, or a compound similar to freidelin.

Acknowledgments

The writer is deeply indebted to Dr. F. A. McClure for his suggestion of the problem and continued interest in the work; to Dr. H. S. Frank for his advice and encouragement; to Dr. H. P. Kung for his help and consultation, and for abstracting this paper in Chinese; and to Dr. H. T. Chen for taking the photomicrographs accompanying the paper. It was the original intention to have all the crystalline products obtained in this work photographed, but the work was interrupted before this was done.

竹身白粉中之結晶物

曾朝明著

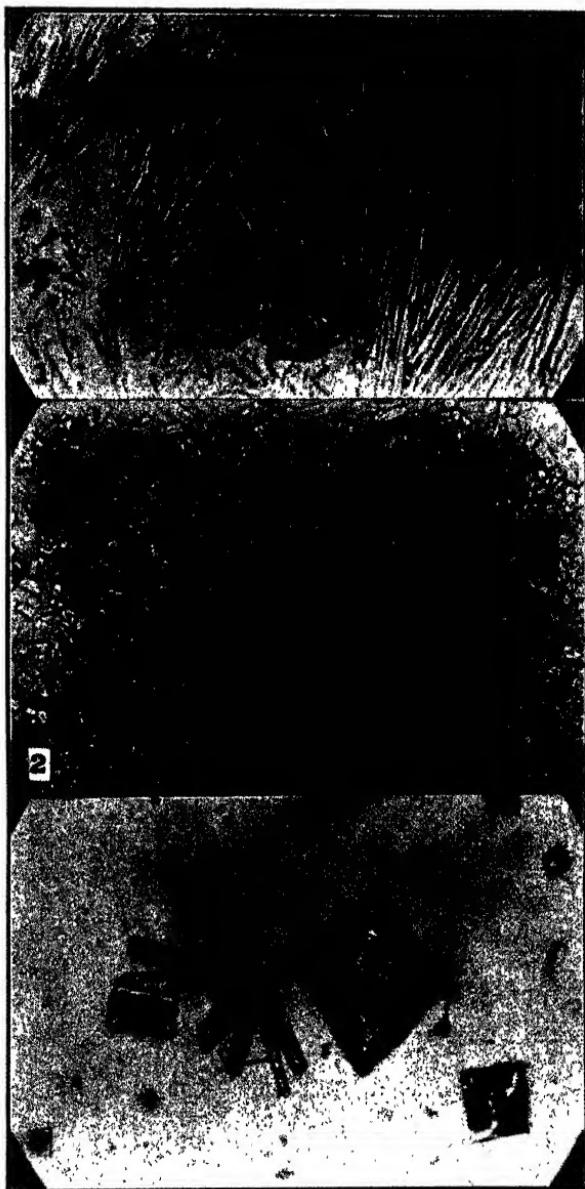
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(摘要)

本文對於竹身白粉之化學性質，作初步之研究，其中結晶部分具有複雜環烴酮之性質。似係 freidelin 或其類似物。

Explanation of Plate

- Fig. 1. Crystals A.
2. Acetyl chloride derivative.
3. Hydrochloric acid derivative



MALARIAL PARASITES AND DISTRIBUTION OF MALARIA
ON
HONAM ISLAND, CANTON, CHINA

By WM. W. CADBURY, A.M., M.D., F.A.C.P., S.C.D.

In a previous communication (Cadbury, 1935) I have reported on the seasonal incidence of malaria on Honam Island, Canton. It was shown that there is a definite seasonal variation in the disease. The highest peak was reached in one of the five months of September, October, November, December or January. Another high peak came in May. The maximum corresponds in general with the so-called dry season when relative humidity is also low. With the onset of cold weather, in January and February, the disease is checked even before the rains begin.

Of course the occurrence of the disease is closely bound up with the anopheles mosquito which is the proved carrier of the infection. The most important contribution to this phase of the problem is the extensive work of Jackson (1936) in Hongkong. Here *Anopheles maculatus* has always been considered the chief vector. It has now been proved to be of only secondary importance. *A. hyrcanus*, the chief vector in Shanghai, is seldom involved. *A. minimus* and *A. jeyporiensis* have been shown by Jackson to be the most common vectors of malaria in the colony of Hongkong.

Wu (1935 & 1936) in a study of the mosquito larvae and of mosquitoes collected on the Lingnan University Campus and in the environment of Canton, has confirmed the present writer's conclusions concerning the seasonal incidence of malaria, based on the effects of rainfall, humidity and temperature on the livelihood of the mosquito carrier.

The only mosquito found infected was *A. minimus*, and that in the months of January, May, June, September, October and December. The highest incidence of infectivity occurred in September and June when over 9% of infected mosquitoes were found.

Faust (1928) states that studies in Japan indicate that *A. hyrcanus* is the natural definitive host of *P. vivax*, and in Formosa this species has been found naturally infected with all three types of the plasmodium. He says that *A. minimus* has also been found naturally infected with *P. malariae*.

We may now consider the distribution of the malaria parasite, with a special reference to China. In an editorial (1929) in the Journal of the American Medical Association the statement is made that "the already recognized types of malarial parasites and anopheles carriers present a considerable number of variables that have greatly complicated the problems of malaria control."

"The intricacy presented is illustrated in a recent survey by officers of the United States Public Health Service (Barber & Komp, 1929) regarding the seasonal and regional incidence of malaria parasites.

"It indicates that in the South-Eastern United States there is a marked predominance among malaria cases in the white race of *P. vivax* in the Spring months and of *P. falciparum* in the Autumn.

"In the colored race there is less indication of a seasonal incidence of types of parasites, but the incidence of *P. falciparum* is higher in all months than in the white race.

"The greater resistance of *P. vivax* to treatment or to other anti-malarial influence is probably the most important factor in determining the seasonal variation of *P. vivax* and *P. falciparum* in the white race and of the high incidence of *P. falciparum* in the colored."

Knowles & White (1931) state that *P. malariae* is the oldest of the three species. It is gradually disappearing. *P. vivax* was probably the second species to appear. It is more adapted to man and causes less clinical disturbance. It follows man to higher latitudes and altitudes than *P. falciparum*. It is the most widespread and is usually an autumn parasite. The relative proportion of the three species within the area bounded by the 70° F. summer isotherm (20°C.) should theoretically be *P. vivax* 39%, *P. malariae* 18% and *P. falciparum* 43%. Actual proportions are, however, *P. vivax* 43%, *P. malariae* 8%, *P. falciparum* 49%.

Edge (1937) taking his data from the British Colonial Medical Reports for the year 1935, finds that among 61,000,000 people of the British Colonial territories, there were over 6½ million cases of malaria treated at various medical centers during the year. The relative incidence of different species is shown in the attached table 1.

TABLE I

GEOGRAPHICAL GROUP	TYPE OF INFECTION AND PER CENT OF TOTAL POSITIVE FINDINGS		
	<i>P. vivax</i>	<i>P. malariae</i>	<i>P. falciparum</i>
Mediterranean & Near East	88.6	4.4	7
Far East	82.6	1.8	15.4
British Tropical Africa	5.	3.8	91.2
West Atlantic and Caribbean Sea	78.9	0.7	20.4

Let us now consider the incidence of the various malarial parasites for China. Taking general surveys of the country we have several references on the subject (table 2). Feng (1935) in an extensive review of the situation throughout China concludes that the northern limit for *P. falciparum* infection seems to be somewhat

TABLE 2
Relative Incidence of Types of Malaria in Various Places in China

PLACE	HOSPITAL	AUTHOR	YEAR	TOTAL CASES	P. VIVAX %	P. FALCI- PARUM %	P. MAL- ARIAE %	P. VIVAX & P. FALCIP. %	OTHER MIXED %	REMARKS
Honam, Canton	Student Infirmary	Cadbury	1929- 1931	148	86	13			1	
Honam, Canton	Village Hospital	Cadbury	1929- 1931	465	72.69	24.08	2.79	0.42		
Amoy	—	Feng (1932)	1931	63	11	63	1.5	19	5.5	
Chang- Chow Ku	—	Yui & Patr. (1935)	1933	203	31.7	62.6	3.1	1.8	.0.8	P. vivax reached peak in July P. falcip. in Oct.
Fouchow	—	Wong, Kang & Jarvis (1937)	1935	107	15	55	3.6	23.4		
Hongkong	Gort.	Director Med. Serv. (1936)	1936	417	35.9	62.4	1.7			
Kwang- tung	Ry. Em- ployees	Feng (1937)			74.5	25	0.5			
Mintsing Fu	Dang, Hemeway & Lai (1935)			100	74	7	19			Northern border of Prov.

Nanking	Laborers near Meng Tomb	Jettmar (1932)	1932	293	16.04	81 ♀	1.02	7.9% of all laborers infected
Nanking	Nankung & vicinity	Khaw & Kan (1934)	1932		65	27	8	
Nanking	Central Hosp.	Yang & Chang (1934)	250	43.6	49.6	0.8	0.4	6.0
Shanghai	Kaochiao Disp.	Lai, Li & Chang (1935)		59.9	6.4	23.8		2.8% of 31, 256 dis- pensary cases were diagnosed clinically as malaria.
Shanghai	Kaochiao School Children	Andrews & Chiu (1937)	324	86.7	5.9	7.4		In Spring 1.7% inci- dence, in Autumn 8%.
Soochow	Eliz. Blake Sun & Young (1931)	1931	120	24.1	70.	1.6	4.1	In-patients.
ditto	ditto	1931	47	23.4	44.7	31.9		Out-patients
Soochow	Eliz. Blake Chang, Lu & Young (1937)	1933	196	32	63.	0.05		
Wu-sih	St. Andrews (1937)	P'an 1930- 1931	225	12.4	52	0.9	0.9	33.8 The peak of tertian malaria was in Aug. For subtertian it was in Sept. & Oct.

near Kai Feng (about 35° N. latitude). North of this *P. vivax* is the only form of infection generally present, although cases of quartan malaria do occur. In a later contribution Feng (1937) concludes that *P. vivax* is found all over China. It is the predominant species in North, Central and South China where malaria is endemic and not epidemic. *P. malariae* is found everywhere, but is rare in most places. It is most common in Chekiang, Yunnan and Kiangsu. *P. falciparum* is limited to Central and South China and does not extend above 35° N. latitude. Hsu and Ke (1937) report on 19 communicable diseases in China. Data were obtained from 204 hospitals all over China. Of all the diseases reported malaria constituted 50.2%. Whereas in North China malaria constituted only 0.2% of all in-patients, in Central China it was 3.34% and in South China 6.39%. Faust (1928) states that tertian malaria has been found as far north as the Ordos, north of Shensi, along the Black Dragon River of Manchuria and in the vicinity of Vladivostock.

The National Health Administration of Nanking (1932) through its Public Health Reports describes a survey made of the endemicity of malaria in Nanking, Soochow, Hangchow, Wukang and other districts along the Yangtze Valley. Taking the types of malarial parasite as a basis of comparison, the most frequent types of malaria in the various places visited are as follows:

Nanking—malignant tertian (imported by laborers for the various works of construction).

Soochow—probably benign tertian.

Hangchow—malignant tertian.

Wukang—both malignant and benign tertian.

Wuhu, Sah-ho, Nanchang and Hankow—probably benign tertian.

Anking and Kiukiang—probably malignant tertian.

Hsia-Chiu-kow—malignant and benign tertian.

In Kaifeng, Honan, Johnstone (1934) studied the incidence of malaria during a severe epidemic. Previously the disease had been quite insignificant. *P. vivax* was the most prevalent form. In the south and west of the province, *P. falciparum* was most common. Two cases, infected with *P. malariae* were very severe. L. C. Feng (1936) concludes from a survey of Kwangsi Province that all three species of malaria parasites may be found. In endemic places, *P. vivax* is most common but in villages where an epidemic had occurred, *P. falciparum* forms a higher percentage. *P. malariae* is very rare. In a survey of the incidence of malaria during the summer of 1932 in Nanking and vicinity, Khaw and Kan (1934) made a study of the relative incidence of the disease. (See table 2.) *P. vivax* reached the highest percentage in May (79%) and June (72%). In July it was 65% of the total in the suburban areas. *P. falciparum* reached the highest percentage in August (52%) and September also 52% in rural areas. *P. malariae* was predominant in late autumn in the rural areas. The Report of the Commissioner of Public Health of Shanghai for 1936 reports that only benign

malaria had been found in the Settlement up to 1935, but in 1936, 14 cases of *P. falciparum* were discovered as against 7 cases of 1935.

By reference to table 2 the relative incidence of the parasites may be noted in various other cities of China and compared with the findings at Honam in Canton.

The data on which the present study is based consist of 1238 cases diagnosed as malaria from October 1928 to December 1931, inclusive. Of these 347 occurred among students and staff of Lingnan University and were generally treated in the Infirmary located on the campus, Honam, Canton. The infection in these cases was usually acquired on the campus, in the homes, the dormitories or the lecture halls of the University. Most patients entered the infirmary as in-patients.

In addition, 1891 patients were studied at the small Lingnan Hospital, also located on the University campus. A few of these were University workmen, living generally in near-by villages. The majority, however, were villagers from Honam Island, and were seen as out-patients at the hospital. They represent in general the normal endemic malarial infection of the district.

Taking first the staff-student group. These patients were usually seen within a few hours of the onset of symptoms. Quinine was administered if definite clinical symptoms pointed to malaria.

By reference to table 3 the relative incidence of parasites is to be seen. During the 4 years no parasites were found in half the patients clinically diagnosed as malaria. In over 5% the type of

TABLE 3
Relative Incidence of Various Types of Malaria Parasites Among Staff & Students

	1928		1929		1930		1931		TOTAL FOR 4 YEARS	
	NO. OF CASES	PER CENT	NO. OF CASES	PER CENT	NO. OF CASES	PER CENT	NO. OF CASES	PER CENT	NO. OF CASES	PER CENT
<i>Plas. vivax</i>	2	5.88	41	45.55	35	32.71	49	42.24	127	36.62
<i>P. falciparum</i>	1	2.94	11	12.22	3	2.8	4	3.44	19	5.47
<i>P. vivax</i> and <i>P. falciparum</i>	0	0	0	0	1	0.93	0	0	1	0.28
<i>P. malariae</i>	0	0	0	0	0	0	1	0.86	1	0.28
Parasites present not identified	4	11.76	9	9.99	2	1.79	4	3.44	19	5.47
No parasites found	27	79.41	29	32.22	66	61.6	58	50	180	51.87
Total cases	34		90		107		116		347	

TABLE 4
Monthly Incidence of Parasites Among Staff and Students of Lingnum University

	YEAR	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
<i>Plas.</i> <i>vivax</i>	1929	0	1	4	2	7	2	1	1	7	4	7	5
	1930	1	2	3	4	7	4	0	1	1	3	5	4
	1931	0	3	2	3	6	7	1	0	6	3	8	10
Total	1	6	9	9	20	13	2	2	14	10	20	19	
Per cent	0.80	4.80	7.20	7.20	16.00	10.40	1.60	1.60	11.20	8.00	16.00	15.20	
<i>Plas.</i> <i>falciparum</i>	1929	0	0	0	1	0	0	0	0	4	2	3	1
	1930	0	0	0	1	0	0	0	0	1	1	0	0
	1931	0	0	0	1	0	0	0	0	1	1	0	1
Total	0	0	0	3	0	0	0	0	6	4	3	2	
Per cent	0	0	0	16.67	0	0	0	0	33.33	22.22	16.67	11.11	
<i>Plas.</i> <i>malariae</i>	1929	0	0	0	0	0	0	0	0	0	0	0	0
	1930	0	0	0	0	0	0	0	0	0	0	0	0
	1931	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	1
Per cent	0	0	0	0	0	0	0	0	0	0	0	0	1.0
Parasites not identified or not found.	1929	11	2	4	4	3	1	3	0	2	2	4	2
	1930	2	3	0	0	14	7	2	0	4	10	18	4
	1931	4	0	8	6	10	4	3	0	13	9	4	1
Total	17	5	12	10	27	12	8	0	19	21	26	7	
Per cent	10.36	3.05	7.33	6.10	16.48	7.33	4.88	0	11.59	12.81	15.86	4.27	

parasite was not mentioned. There was only one patient with quartian parasites and one with a mixed infection. It is at once evident that *benign tertian malaria* was far more common than the malignant type. For the 4 years it amounted to 36.62% of all cases while the malignant cases were only 5.47% of all cases. In 1929 when there were only 32.22% of cases in whom there were no parasites seen, the percentage of *P. vivax* rose to 45.55% of cases. If we estimate only those cases in which parasites were found then for 4 years in 148 cases there were 86% infested with *P. vivax*, and 13% with *P. falciparum*. Since there were about 1000 students enrolled at the University each year, there were approximately 10% infected each year.

A glance now at table 4 indicates the months in which malaria was most prevalent. Thus, 16% of *P. vivax* infections occurred in May and November and 15.2% in December. On the other hand 33.33% of the malignant infections were in September, 22.22% in October, and 16.67% in November, while 16.67% were in May. Thus the malignant malaria is most definitely an autumn disease. In general, it may be added, infection among the staff-student group was new. In the village group, on the other hand, many of the cases were simply recrudescence of endemic infection, beginning in childhood.

If we now compare the parasite incidence among patients seen in the Village Hospital—villagers and University workmen—we may refer to table 5. For 1928 practically all cases were seen in the last

TABLE 5
Relative Incidence of Various Types of Malaria Parasites Among Workmen & Villagers

YEAR	1928		1929		1930		1931		TOTAL FOR 4 YEARS	
	NO. CASES	PER CENT	NO. CASES	PER CENT	NO. CASES	PER CENT	NO. CASES	PER CENT	NO. CASES	PER CENT
<i>Plas. vivax</i>	13	18.30	156	43.33	104	37.54	65	35.52	338	37.92
<i>P. falciparum</i>	15	21.12	63	17.5	20	7.22	14	7.65	112	12.57
<i>P. vivax</i> and <i>P. falciparum</i>	1	1.4	1	0.27	0	0	0	0	2	0.22
<i>P. malariae</i>	1	1.4	7	1.94	5	1.8	0	0	13	1.46
Parasites present not identified	0	0	1	0.27	5	1.8	2	1.09	8	0.90
No parasites found	41	57.74	132	36.66	143	51.62	102	55.73	418	46.91
Total cases	71	3	360		277		183		891	

3 months of the year, since the Hospital was only opened October 1. Only 11 cases are reported for the other 9 months out of a total of 71 patients for the year.

TABLE 6
Monthly Incidence of Parasites Among Villagers on Honam Island & University Workmen

	YEAR	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPT.	OCT.	NOV.	DEC.
<i>P. vivax</i>	1929	6	8	1	2	1	8	19	10	18	33	29	21
	1930	9	7	4	7	9	2	6	No. exp.	10	4	17	29
	1931	3	0	2	3	3	7	0	3	7	14	3	20
Total	18	15	7	12	13	17	25	13	35	51	49	70	
Per cent	5.54	4.61	2.15	3.69	4.00	5.23	7.69	4.00	10.77	15.69	15.07	21.53	
	1929	*	10	4	4	2	2	1	4	0	2	7	9
	1930	6	1	2	0	0	1	0	0	0	1	7	2
	1931	1	1	1	1	0	0	0	1	1	2	3	3
<i>P. falciparum</i>	Total	17	6	7	3	2	2	4	1	3	10	19	23
	Per cent	17.51	6.19	7.22	3.09	2.06	2.06	4.12	1.03	3.09	10.31	19.59	23.71
	1929	3	1	0	1	0	0	0	0	0	0	0	2
	1930	1	0	1	0	3	0	0	0	0	0	0	0
<i>P. malariae</i>	1931	0	0	0	0	0	0	0	0	0	0	0	0
	Total	4	1	1	1	3	0	0	0	0	0	0	2
	Per cent	33.33	8.33	8.33	8.33	25.00	0	0	0	0	0	0	16.67
	1929	3	11	15	5	8	9	8	18	9	16	12	18
	1930	6	8	6	3	7	4	15	28	12	16	16	23
Parasites not identified or not found.	1931	11	5	4	2	12	10	12	13	10	11	9	5
	Total	20	24	25	10	27	23	35	59	31	43	37	46
Per cent	5.26	6.32	6.58	2.63	7.11	6.05	9.21	15.53	8.16	11.32	9.74	12.10	

The total number of negative bloods was only 46.91%. In 0.9% of the positives the type of parasite was not stated. There were 13 cases of quartian disease or 1.46% and 2 of mixed infection. *P. vivax* infection accounted for 37.92% of all cases and *P. falciparum* for 12.57%. Only in 1928 was the latter more prevalent than the former and that is probably because of the dearth of statistics for the first 9 months. In 1929, *P. vivax* accounted for the highest percentage of cases—43.33%.

Excluding all cases in which no parasites were found, or in which they were not differentiated, we have a total of 465 positive cases. Of these 338 or 72.68% were infected with *P. vivax*; 112 or 24.08% were due to *P. falciparum*; 2 or 0.42% were the result of mixed infection by *P. vivax* and *P. falciparum*; and 13 or 2.79% were *P. malariae* cases.

Compared with the percentages obtained for the staff student group we note that the relative proportion of *P. vivax* was greater than for the village group, where *P. falciparum* and *P. malariae* are relatively more common.

In table 6 the seasonal incidence of the different types of malaria is recorded. For *P. vivax* 22.22% occurred in December. In October and November the percentage was 15 to 16% and in September 11.11%. For the other months the percentage of incidence is nearly the same. A similar relation exists for *P. falciparum*. The highest incidence was in December, with 23.71% of all cases. Next came November, January and October in proportion of cases. The smallest incidence was in August, April, May and June. *Plasmodium malariae* was found in January to May and in December. In table 7 the relative number of malaria cases to the total number of all patients seen in the village hospital is recorded. Here it is quite

TABLE 7
Percentage of Malaria Cases to Total New Cases Seen Each Month
in the Village Hospital

	TOTAL FOR 1928-1931											
	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Total 1st calls in dispensary	363	336	506	452	500	488	571	495	517	555	435	402
Total cases of malaria	59	46	40	26	45	42	54	73	69	104	105	131
Percent of malaria cases to all calls	16.25	13.69	7.90	5.75	9.00	8.61	9.46	14.75	13.34	18.74	24.14	34.85

clear that December and November are the worst months. Then come October, January, August, February and September, leaving March to July inclusive with a relatively low incidence of malaria.

Geographical Distribution of Malaria Cases on Honam Island

The patients suffering from malaria who form the basis of the second part of this study, came mostly from villages on the Island of Honam.

In a general survey of the island by Feng and Yung (1931) it is stated that the island is located at 23° 06' N. Lat. and 113° 19' E. Long., in the P'un Ue District of Kwangtung. The maximum length of the island is ten and one fourth miles and its greatest width three and one half miles, with a total area of 35 square miles. Most of the land is devoted to farming, with the exception of hills to the east of Lingnan University. South of the central high land is a broad plain adapted to truck farming. The delta land is used for cultivating water crops and there are numerous groves of citrus and other fruit trees, planted on dikes, with irrigation ditches between. The land around the periphery of the island is largely given to rice planting, as is also the case of low lying areas where irrigation from canals is available.

In the present study the urban population of the northwestern portion of the island is not included. The cases of malaria treated in the village hospital came mostly from the villages in the central and eastern area of the island. Naturally that part nearest to Lingnan University showed the greatest number of patients. The attached map is one modified from that used by Feng and Yung (1931) in their survey, and it in turn was based on one issued by the Canton Municipal Public Bureau.

In table 8 are listed the Honam villages noted on the map. Patients have been treated from all these places in the hospital but in only 32 of them were malaria cases cited.

TABLE 8

List of villages on Honam Island from which cases of malaria were seen at the Lingnan Village Hospital

NAME OF VILLAGE		NO. CASES TREATED					
		NO. ON MAP	1928 3 MOS.	1929	1930	1931	TOTAL 4 YRS.
Aap Tun Kwan	鵝整岡	40	2	18	1	0	21
Chek Kong	赤岡	14					
Chek Sha	赤沙	6	3	4	0	1	8
Chong Tau	莊頭	55					
Haak Tsuen	客村	26	3	10	13	12	38
Ha Kaau	下激	22					
Ha To	下渡	30	1	30	27	16	74
Hau Kaau	後激	20					

Honglok	康樂	31	21	160	79	52	302
I Chung Hau	二浦口	41	0	0	0	1	1
I Lok Tsuen	怡樂村	36	0	5	4	2	11
Iu Tau	瑞頭	54					
Kaak Shaan	隔山	53	0	1	0	1	2
Kau Fung Wong	舊鳳凰	37	2	18	26	10	56
Kau Shi Tau	舊市頭	16	0	5	0	0	5
Kei Laap Tsuen	基立村	49					
Kong Pui	江背	17	0	7	3	2	12
Kong Tsuen Tau	江村頭	7	0	8	10	1	19
Koon Chau	官洲	3					
Kwai Tin	桂田	27	3	7	6	4	20
Lai Chi Kei	荔枝基	34	0	4	2	3	9
Lik Kaau	灝漖	21	1	0	1	1	3
Lo Kong	羅岡	29	5	34	26	17	82
Lum Tau	樹頭	4	0	0	0	1	1
Lung Taam	龍潭	13	0	6	4	5	15
Lung Tin	龍田	57					
Ma Chung Kiu	馬涌橋	52					
Naam Chau	南洲	46					
Naam Kei	南基	56					
Naam Pin	南邊	59					
Naam Shek Tau	南石頭	60					
Naam Tin	南田	51					
Naam Tong	南塘	24					
Naam Tsuen	南村	50					
Ng Tsuen	五村	38	3	6	3	5	17
Po Chan	寶洲	5					
Sai Kaau	西漖	25					
Sai Kong	西江	9					

Sai Tsuen	西 村	32	2	0	0	0	2
San Chau	新 洲	1					
San Chong	新 庄	45	0	11	0	3	14
San Fung Wong	新 凤 鳳	35	6	63	36	36	141
San Shi Tau	新 市 頭	15	0	0	1	0	1
San Tsuen	新 村	12	4	20	24	10	58
Sha Naam	沙 南	33	0	1	1	0	2
Sha Tau	沙 頭	42	1	1	4	1	7
Shek Chung	石 潘	44					
Shek Kai	石 桥	47					
Shek Lau Tsuen	石 榴 村	58	0	1	1	2	4
Sheung Chung	上 潘	19	2	11	3	6	22
Sheung Kaau	上 巍	23					
Sin Chau	小 洲	10					
Siu Kong	小 港	43				1	1
Sui Po	瑞 寶	39	2	18	15	5	40
Taai Tong	大 塘	8	0	7	0	0	7
To Wah	土 華	18	3	23	17	8	51
Toi Chung	苔 潘	11					
Tso Fong	草 翩	48					
Tun Woh Shn	敦 和 市	28					
Wong Po	黃 埔	2					

Two factors naturally have a decided bearing on the number of cases reported from any one village, namely, the size of the village and its distance from the hospital. Taking these into consideration, however, another rather striking fact appears by a glance at table 8, and by comparing the location of the villages with the map. It becomes evident that the infected areas were inland, rather than along the shore, and on the one hand, given over to truck raising, while the flooded areas where rice is grown, or where the tidal water from the river rises and falls in the irrigation ditches, showed a lower incidence of malaria. This may be better noted in the list of villages, table 9, showing the incidence of infection from the highest to the lowest.

TABLE 9
Villages Arranged in Accordance with Degree of Infectivity

NAME OF VILLAGE	TOTAL CASES OF MALARIA
Honglok	302
San Fung Wong	141
Lo Kong	82
Ha To	74
San Tsuen	58
Kau Fung Wong	56
Tsai Tong	51
Sui Po	40
Haak Tsuen	38
Sheung Chung	22
Aap Tun Kwan	21
Kwai Tin	20
Kong Tsuen Tau	19
Ng Tsuen	17
Lung Taam	15
San Chong	14
Kong Lui	12
I Lok Tsuen	11

Thus this study tends to bear out the general impression that the malaria bearing anophelines tend to breed in the ditches and ponds about villages where truck gardening is generally practiced—rather than in the rice fields, and in the canals with free access to the tidal water.

Summary

A study was made of endemic malaria on Honam Island, Canton, during the years 1928, 1929, 1930 and 1931.

There were 347 Lingnan University students and staff and 1891 workmen and villagers studied.

Of infected students and staff 86% showed *P. vivax* and 13% *P. falciparum*.

Most students were infected in the Autumn and early Winter months.

Among villagers the incidence was 72.69% for *P. vivax* and 24.08% for *P. falciparum* and 2.79% for *P. malariae*.

Here again most cases occurred in the fall. When malaria was compared to all hospital calls the greatest proportion of malaria calls was found in November and December.

The geographical distribution of the malaria patients is given, illustrated by a map of Honam Island.

References

- ANDREWS, MARY N., AND CHU, TSO-CHIH.**
 1937. Notes on a malaria survey in Kiao Chiao. *Chin. Med. Jour.* 52 : 884-886.
- ANONYMOUS.**
 1929. Editorial. *Jour. Am. Med. Assn.* 93 :1474.
- BARBER, M. A., AND KOMP, W. H. W.**
 1929. U. S. Pub. Health Rept. 44 :2048, Aug. 23
- CADBURY, W. W.**
 1935. Seasonal incidence of malaria on Honam Island, Canton. *Ling. Sci. Jour.* 14 :241-248.
- CHANG, Y. H., LI, C. C., AND YOUNG, M. P.**
 1935. A clinical and laboratory study of 196 cases of Malaria. *Chin. Med. Jour.* 49 :477-478.
- DANG, M. C., HEMENWAY, R. V., AND LAU, STEPHEN.**
 1935. Report of 960 cases of malaria in Mintsing, Fu. *Chin. Med. Jour.* 49 :1235-1240.
- DIRECTOR, MEDICAL AND SANITARY SERVICES, HONGKONG.**
 1936. Annual Report, p. 34-36
- EDGE, P. G.**
 1937. The incidence and distribution of malaria in British Colonial Possessions, Supplement to Tropical Diseases Bulletin. Nov., p. 3.
- FAUST, E. C.**
 1928. Mosquitoes in China and their potential relationship to human disease JV International Congress of Entomology, Ithaca, N. Y., vol. 2, p. 259-267.
- FENG, LAN-CHOU.**
 1932. Investigations on malaria and its transmission in Amoy, Fukien Province, South China. *Jour. Trop. Med. & Hyg.*, July 1 and 15.
 1935. The present status of the knowledge of the mosquitoes of China and their relation to human disease. *Chin. Med. Jour.* 49 :1183-1208.
 1936. Malaria and its transmission in Kwangsi, China. *Chin. Med. Jour.* 50 :1799-1814.
 1937. The Anopheline mosquitoes and the epidemiology of malaria in China. *Chin. Med. Jour.* 51 :1005-1020.
- FENG, RUI, AND YUNG, P. H.**
 1931. A general descriptive survey of the Honam Island Village Community. *Ling. Sci. Jour.* 10 :153-186.
- HSU, S. C., AND KE, C. T.**
 1937. An investigation of nineteen communicable diseases in China. *Chin. Med. Jour.* 51 :833-850.
- JACKSON, R. B.**
 1936. Annual Report of the work of the malaria bureau for 1936, Annual Report of the Director of Medical and Sanitary Services, Hongkong, p. 127-161.
- JETTMAR, H. M.**
 1932. Beiträge zur Epidemiologie der Malaria und Pest in fernen Osten. *Zentralbl. f. Bakteriol.* 127 :178-185.
- JOHNSTONE, I. L.**
 1934. Note on malaria epidemic in Honam, 1931. *Chin. Med. Jour.* 48 : 56-58.

KHAW, O. K., AND KAN, H. C.

1934. Some observations on the prevalence of malaria in Nanking and its vicinity. *Chin. Med. Jour.* 48:109-128.

KNOWLES, R., AND WHITE, R. S.

1931. Studies in parasitology of malaria. *Chin. Med. Jour.* 45:332-347.

LAI, D. G., LI, YU-YEN, AND CHANG, WEI

1935. A malaria survey in Kao-chiao, Shanghai. *Chin. Med. Jour.* 49: 462-468.

NATIONAL HEALTH ADMINISTRATION, NANKING

1932. Medical and health reports. *Chin. Med., Jour.* 46:719-726.

PAN, J. S.

1937. Malaria in Wusih. *Chin. Med. Jour.* 51:971-978.

SHANGHAI MUNICIPAL COUNCIL

1936. Report of Commissioner of Public Health, 1936, p. 34.

SUN, T. C. Y., AND YOUNG, M. P.

1931. A report on 167 cases of malaria. *Chin. Med. Jour.* 45:258-265.

WONG, H., KANG, T., AND JARVIS, B. W.

1937. Some notes on malaria in Foochow. *Chin. Med. Jour.* 51:385-390.

WU, LIANG-YU

1935. Investigations on natural infections of Anopheline mosquitoes with malarial parasites in Canton. *Ling. Sci. Jour.* 14:691-692.

1936. Anopheline larvae of Kwangtung Province with notes on their relation to the incidence of malaria. *Ling. Sci. Jour.* 15:265-274.

YANG, C. S., AND CHIANG, W. L.

1934. Some notes on malaria in Nanking. *Chin. Med. Jour.* 48:124-137.

YUI, E. M., AND PATY, R. M.

1935. A review of 203 malaria cases. *Chin. Med. Jour.* 49:1228-1234.

瘧原蟲及瘧疾在中國廣州河南島之分佈

嘉惠著

(摘要)

本市河南境內在一九二八至一九三一年。每年流行瘧疾之研究情形。

嶺南大學校內員生共三百四十七人，又工人及村民共一千八百九十一人曾供研究，曾受傳染之員生百份之八十六顯現間日瘧原蟲又百份十三為夏秋瘧原蟲各生多在秋季或初冬之月感染此疾：村民感受此病者百份之七十二・六九為間日瘧原蟲又百份之二十四・零八為夏秋瘧原蟲又百份之二・七九為三日瘧原蟲，此病大多數在秋季發生，瘧疾受診人數與全院受診人數比較其最大比例乃在十一月及十二月。瘧疾之分佈河南全診內地圖如次。

**A LIMA BEAN LEAF-FEEDER, DIACRISIA OBLIQUA WKR.
(LEPIDOPTERA: ARTHIIDAE)¹**

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On Nov. 4, 1930, a group of newly hatched larvae was collected from the lima bean field. They were on the under surface of the lima bean leaves and had probably hatched on Nov. 3. From this group of young larvae the writer was able to follow completely the life history of these insects. These larvae became full grown and made their cocoons early in Dec. 1930 and emerged as adults early in Jan. 1931. The male adults lived 12 to 24 days, females 14 to 27 days. The total number of eggs laid by each individual female in this generation varied from 342 to 1356. The incubation period of the eggs laid by these adults varied from 10 to 17 days. The percentage of eggs hatched was about 82.96 to 91. The larvae of the following generation matured and made their cocoons late in March, emerged as adults in the middle of April. The latter adults lived only about 7 to 9 days and laid fewer eggs. The incubation period was also shorter, varying from 6 to 11 days. The total number of generations in one year has not been determined but there are at least four generations.

The Egg.—The egg (fig. 1a) is spherical with a very smooth surface and is about 1 mm. in diameter. The eggs are mostly deposited in masses, arranged more or less in rows, on the under surface of leaves of the host plant. The greatest number of eggs contained in one mass was 411 and the lowest number was three or two and even sometimes only a single one, but on an average there are 20 to 100. The newly laid egg was bright green, later on changed to light greenish-yellow, then to pinkish-yellow. Before hatching it changed to grayish-white. The infertile eggs remained pale greenish-yellow. The incubation period was 10 to 17 days for the eggs laid in January and 6 to 11 days in April. In January 82.96% to 91.00% of the eggs hatched while in April only 52% to 73% hatched. The eggs laid in April were not so uniform in duration of the incubation period as those laid in January. In April the humidity and the temperature were higher. Even in a given mass some eggs hatched quicker than the others. The newly hatched larvae were very fond of eating the eggs. As would be expected the larvae were more active in warmer weather. In many cases, in addition to the infertile eggs and the empty egg shells, the developing embryos were also eaten by the early hatched larvae. Furthermore, under a high humidity and tempera-

¹Contribution from the Lingnan Natural History Survey and Museum, Lingnan University.

ture molds grow more abundantly on the food plant. The shells of the eggs are very thin and the embryos are very easily killed by the attack of mold. There were a number of eggs killed by mold even when the embryos were fully developed and ready to hatch. When the embryo is fully developed and ready to hatch, the shell is transparent and under a binocular microscope we can very easily see the developed embryo inside of the shell. It first shows a black head with reddish mouth parts.

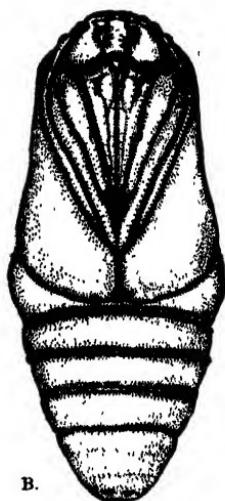


Fig. 1. A, Eggs; B, Ventral view of larva. Drawn by Maak Shiu Shing.

23, there was an egg which started to hatch at 3:00 p.m. The young larva finished its cutting and came out of the egg shell at 4:35 p.m. In this case it took about one hour and thirty-five minutes to finish the hatching process.

The Larva.—The larvae (fig. 2, 3) are very serious pests on the host plants. The newly hatched larva is about 2 to 2.5 mm. long and .4 mm. in diameter. Its head is bright brown with brownish-red mandibles. Its body is fleshy yellowish-green, covered with numerous hairs. On the dorsal surface of the body on the meso- and metathoracic segments there are six very long tufts of yellowish-brown hairs, equally divided in number, along both sides of the dorso-median line, while on all of the abdominal segments there are only two on each side. In the center of the dorsal surface of the prothorax there is a long transverse brownish marking, covering half of the area, accompanied by a number of short brown hairs. The hairs on the rest of the body are yellowish-white and much shorter. Most of the hairs are on the tubercles which are pale brown in color and arranged with a definite

During hatching, we can see through the egg shell that the mouth-parts of the young larva are moving all the time. It seems to be eating something inside of the egg before it begins to cut an opening in the shell at the top of the egg. When cutting the egg shell open, it tried several times to push its head out through the opening. At first when it pushed out its head there was usually a drop of albumen-like substance in its mouth. It has to try to swallow the "albumen" first. After it has swallowed this it will pull its head back into the egg shell and rest about two to three minutes, then bite the egg shell again and again until the opening is large enough for its head to get out easily. When finally it has pushed its head out of the shell, it rests about three minutes then starts to draw its body out of the shell. It has to draw its body out little by little. When it is trying to draw its body out its head moves backward and forward. It stops its work at intervals to rest. On January

number in a more or less transverse line at the middle of each segment. These tubercles are darker, larger, and more prominent in the older stages. The legs are also brown and bear a number of short yellowish-brown hairs. The body of the newly hatched larva is very wet; the hairs are also wet and curly. Just after hatching the larva stays very quiet, waiting until its body and hairs are dry. It then crawls around on the egg mass and eats the egg shells as well as the infertile eggs and fertile unhatched eggs. One or two days after hatching the larva gradually becomes plump. Its hairs are a little shorter but more in number and darker in color. Its body surface also becomes darker; on the prothorax and the first abdominal segment the tubercles are very dark brown and very prominent. After the second instar the larva is more hairy and the

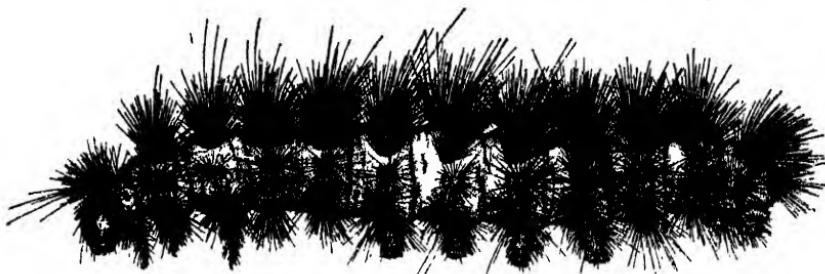


Fig. 2. Full-grown caterpillar. Drawn by Chan Hin Yau

hairs are irregular in length, growing in masses on each of the tubercles. On the meso- and metathorax and also on the first as well as on the last three abdominal segments, on each side of the dorso-median line there are two tubercles which are very dark brown and conspicuous. The cervical shield is dark brown; the dorso-median line is pale. The very young larvae have the habit of gathering and feeding together only on the epidermis of the under surface of the leaf. When they are older, they will start from the edge and eat the whole leaf through. In the older stages the larva is much darker, its hairs are more or less uniform in length, numerous, and very dark brown, appearing very much the same as the dark brown hairs of a dog. This is the origin of its local common name of "Dog-hair-caterpillar" (狗毛蟲). On the average the full grown larva is about 50 to 55 mm. long and 9 to 10 mm. in diameter.

The total larval period of the generation from early November to December required 31 to 37 days, and the generation in late January to March required 56 to 63 days, while in the middle of April to May 29 to 38 days were required. In the November generation the duration of each stadium was more or less uniform. The first stadium varied from 4 to 5 days; the second 4 to 6 days; third 4 to 7 days; fourth 4 to 7 days; fifth 3 to 7 days; sixth 4 to 6 days and the last stadium also 4 to 6 days. In the January generation the larva also had 7 instars but the durations of the stadia varied a

great deal. The first stadium varied from 6 to 7 days; the second 3 to 4 days; third 2 to 3 days; fourth 9 to 12 days; fifth 12 to 14 days; sixth 9 to 11 days; and the last was 10 to 16 days. The duration

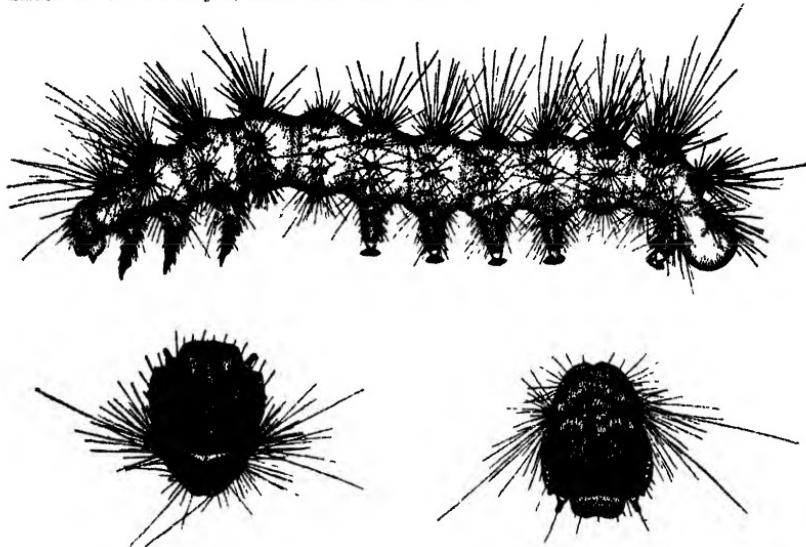


Fig. 3. Above, early stage of caterpillar below,, head box (ventral and dorsal views). Drawn by Chan Hin Yau.

of the last four stadia was much longer because at that time the weather was cooler and the larvae were very inactive. The older larvae were very fond of eating their brothers and sisters. Each time before molting the larva usually stopped feeding for one or more days and was very inactive. In the laboratory, the early molted individuals preferred to eat the more recently molted ones instead of the food plant.

The Pupa.—As soon as the larvae were full grown they entered the soil and spread some yellowish-brown silk, mixed with hairs from their bodies, to make very thin cocoons (fig. 1b) at or near the surface of the soil. Sometimes the cocoons are placed a little deeper in the soil but not more than 2.5 inches. Often the larvae spread a little silk, only enough to tie some leaves together, so that they could hide themselves among the leaves for pupation—not making cocoons at all. From the time when they began to make their cocoons to the time they actually became pupae, 5 to 6 days were required in all three generations. In the November generation the pupal period varied from 20 to 27 days and in the January generation it varied from 15 to 18 days. The pupa is about 19 mm. long, 9 mm. wide and 8 mm. thick. It is very uniform coffee color, elongate, broadly rounded at the anterior end, and tapering toward the posterior end, with the middle abdominal segments larger in diameter. At the tip

of its posterior end, near to the dorsal side there are two masses of very short brown bristles. The outlines of the antennae, the front legs, and the wing-pads are very conspicuous.

The Adult.—The adult (fig. 4) is dull yellowish clay color on the head, and on the thorax and wings; the antennae and eyes are black. The ventral side of the body of both the male and female is also dull yellowish clay color. The dorsal surface of the abdomen of the female is bright yellow, while that of the male is bright red, but sometimes their colors are reversed. Both male and

female have a dorsal median series of black spots starting on the thorax and running through to the last abdominal segment. The coxa and the femur of each front leg are either red or yellow, the same as the color on the dorsal surface of the abdomen, while the femora of the middle and hind legs are dull yellow. The tibiae and the tarsi of the front and the middle legs are dark brown. On the hind legs the tarsi are also dark brown but the tibiae are the same color as the femora. Except the last abdominal segment, on the lateral side of each body segment there is a more or less triangular black spot arranged in a longitudinal line. On each hind wing, right on the discocellulars, there is a dark brown spot which is about .7 mm. in diameter. Near the outer margin close to the anal angle between the 2nd Cu and the 1st A there is another, somewhat larger, dark brown

spot, accompanied by two very light and small spots each in between the 1st Cu and 2nd Cu and the 1st A and 2nd A. The female, measured from its head to the tip of its abdomen, is about 22 to 23 mm. long, and 8 to 9 mm. wide on the middle abdominal segments, with a wing expanse of 62 to 63 mm. The male is 18 to 20 mm. long, 6 to 7 mm. wide; the wings expanse 47 to 48 mm.

When the adult has just emerged the wings are very short, soft, and smooth. About three minutes later the wings wrinkle and then



Fig. 4. Adult. Drawn by Chan Hin Yau.

expand. During expansion of the wings the adult stays very quiet and holds its wings up in a position perpendicular to the back of the body. It usually stays in a vertical position with its head upward on some object. It rests at intervals while it is expanding its wings. As soon as the adult has its wings fully expanded, it walks around a little, then stays very quiet waiting for the wings to become hardened. In one case the adult took about 25 minutes to have its wings fully expanded and hardened. In the daytime the adults are very inactive and do not move very much even if touched by a pencil. In the night when the electric light is on, the adults are more active and usually fly around in the breeding cage. In January, about two to three days after emergence, the females start to lay eggs; in April they start within one or two days. They may lay their eggs before having mated but the eggs will of course be infertile. In mating, the adults are in opposite directions. The male usually has the tips of its wings extending over those of the female. In most cases they mated in early morning or late in the afternoon. The mating process lasts more than three hours. Some females mate only once during their whole life, but in this case the mating act lasts much longer, while the other females may mate several times and after each mating will lay more eggs. The eggs are laid in a mass made up of a number of rows. The female proceeds forward in laying eggs. When eggs are laid in a vertical row the eggs are laid from the bottom to the top of the row. In the January generation the total number of eggs laid by a given female varied from 342 to 1356; in April it varied from 811 to 1225. The female dies after she has laid all of her eggs. The male usually dies earlier than the female. In January the longevity of the male adults varied from 12 to 24 days; of the female 14 to 27 days. In April the adults lived a much shorter time, 6 to 7 days.

The Host.—The original host plant on which I found these larvae feeding was the lima bean. In the younger stages larvae eat only the epidermis of the under surface of the leaves. When they are older they will eat through the whole leaf, leaving the veins as a net, thus causing great damage to the foliage. Besides this host plant the writer tried to feed them with the leaves of a number of other kinds of plants. They ate a great deal of the leaves of Hoh Lan Tau (*Pisum sativum* L.), Tau Kok (*Vigna sesquipedalis* Wight), and Muk Tau (*Cajanus cajan* (L.) Millsp.). They also ate the leaves of sweet pea (*Lathyrus odoratus* Linn.) but did not like them very much. They were also fed with the leaves of plants other than the legumes, such as Kwan Tat Tsoi (*Beta vulgaris* var. *cicla* L.), Po Tsoi (*Spinacia oleracea* L.), Kai Lan (*Brassica alboglabra* Bailey), Pak Tsoi (*Brassica chinensis* L.), Ye Tsoi (*Brassica oleracea* var. *capitata* Linn.), Kai lan T'au (*Brassica caularapa* Pasq.), Lettuce (*Lactuca sativa* L.), Kuk Fa (*Chrysanthemum sinense* Sabine), Cheuk Yeuk (*Dahlia rosea* Cav.), Canna (*Canna indica* L.), Wong Lai Ch'un (*Rosa moschata* Mill.), Pak Yuk Lan (*Michelia alba* DC.), Wong Yuk Lan (*Michelia champaca* Linn.), Tai Hung Fa

(*Hibiscus rosa-sinensis* Linn.), and Mulberry (*Morus alba* Linn.). They ate the leaves of the above mentioned plants just as readily as the lima bean leaves, especially the leaves of the mulberry and *Hibiscus*. They liked the leaves of mulberry more than any of the others, even more than the original host plant. When they were fed with the leaves of mulberry, they grew very fast and uniformly. Besides these plants, they were also fed on the leaves of Banyan (*Ficus retusa* Linn.), Pummelo (*Citrus maxima* (Burm.) Merr.), Azalea (*Rhododendron Ferrarae* Tate) and two kinds of weeds. They fed on these leaves only enough to support their lives but did not grow very much. From the result of this experiment we know that these larvae will never die from starvation.

Natural Enemies.—Although the larva is very hairy, in many cases it is attacked by a small parasitic wasp which reproduces by polyembryony. The wasp probably lays its egg in the body of the larva in a very early stage or in the eggs of the host. When a larva was parasitized, in the fourth or fifth instar, there were a number of small white grubs which came out of its body through the body wall and then made very small white cocoons among its hairs. The cocoon of the parasite is about 3 mm. long and 1.25 mm. in diameter. The adult parasite is about 2 mm. long and 4.5 mm. with the wings expanded. As soon as the grubs of the parasitic wasp come out of its body the host becomes very inactive and seems somewhat paralyzed. It gradually contracts its body until it is very short and then dries up.

棉豆食葉虫(鱗翅目：燈蛾科)

周郁文著

嶺南大學自然博物採集所技佐

(摘要)

在民國十九年至民國廿年之中，對於此種食葉虫之生活史，著者已有頗詳細之研究。每年至少約有四代；每代卵期約六日至十七日，幼虫期約卅一日至六十三日，各期所需時日多少，全隨季節與溫度而異。在自然環境中，此虫多數僅見於棉豆葉，但在試驗室內，竟能食二十餘種植物之葉；尤其喜食桑。其食葉者之生長，較之食棉豆者速而強。此虫亦極喜食大紅花葉，幼虫常受一種小寄生蜂所侵害。

GENERAL NOTES

The Philippine Journal of Forestry

For the past fifteen years the Bureau of Forestry in Manila has issued a mimeographed quarterly called the *Makiling Echo*, describing the work of the local forest service. It has been felt that this work would be more valuable if reports were printed, thus attaining more durability and a wider circulation. Therefore, the *Makiling Echo* gives way to a publication called the *Philippine Journal of Forestry*, the first number of which reached our office in June. The journal is to be issued quarterly. The first number contains 112 pages. There are 11 articles and two short field notes. The articles are devoted to insect pests, seed germination, forestry practice, and utilization of wood products and are illustrated by many plates (two in color), graphs and figures. The subscription price is two pesos (\$1.00 U. S.) in the Philippines and the United States, \$2.00 U. S. in foreign countries. Subscriptions should be addressed to the Chief, Division of Publications, Department of Agriculture and Commerce, P. O. box 613, Manila, Philippines.

Stanford Ichthyological Bulletin

The first number of this new publication, bearing the date of June 22, 1938, was received in July. It is "issued as a vehicle for the publication of the results of ichthyological research originating in, or connected with, the Natural History Museum of Stanford University." The present number contains only one article "West Indian Clupeid Fishes of the Genus Harengula." There are 56 pages and many tables, figures and photographs. It is expected that the papers printed in the Bulletin will be largely taxonomic or morphological, with emphasis on discussions of the relationships and history of faunas and on the central problems of evolution, adaptation and dispersal of fishes. The Bulletin is printed by photolithography. It will appear irregularly as material becomes available. Inquiries should be addressed: Editor, Stanford Ichthyological Bulletin, Stanford University, California, U. S. A.

BOOKS AND SPECIAL PUBLICATIONS

A BIBLIOGRAPHY OF EASTERN ASIATIC BOTANY, by E. D. MERRILL and E. H. WALKER, xlvi and 719 pages, 2 maps, The Arnold Arboretum of Harvard University, Jamaica Plain, Mass., 1938. \$12.50 U. S. cy.

The appearance of this magnificent piece of work is an event of great interest to all botanists, and especially to those who deal in any way with the rich and varied flora of eastern Asia. It embraces "the literature on all groups of plants of all eastern Asia, except northeastern Siberia. The area covered comprises China, Japan, Formosa, Korea, Manchuria, Mongolia, Tibet, and eastern and southern Siberia. The major published papers appertaining to adjacent areas, such as the Philippines, Indo-China, Siam, Burma, India, and central and northern Asia are included Although the point of view in selection has been taxonomic, admitted papers are by no means confined to that field. Papers on ecology, phytogeography, exploration, economic botany, the history of botany, bibliography, phylogeny, pathology, agriculture, horticulture, forestry, *materia medica*, pharmacy, biography, and many other subjects have been listed. Special attention has been given to bibliographies, because of their value in indicating other data accessory to those made directly available here." But "papers devoted entirely to physiology, morphology, cytology, and genetics, and those without distinct taxonomic, geographic or economic significance are omitted." Publications in practically every language of Europe, and thousands of entries translated from the Chinese and Japanese, have been included. Over 21,000 author entries, with some 1400 cross references, are embodied in the work. The care devoted to the examination of the articles themselves has made available much obscure but valuable information concerning Asiatic species which would never be suspected from the titles alone. A Reference List of some 1200 "Serial Abbreviations," occupies the first thirty pages of the work. The next 551 pages, constituting the main body of the volume, are devoted to the Author and Title index. In the Appendix we find the older oriental works in Chinese and Japanese arranged by author and title, next come reference lists of Oriental serials, each list being followed by an index in the original language, and one in romanized, to the titles of these serials. A most valuable feature of the work is the series of indices by subjects, occupying some 120 pages and arranged under the following headings: General, Geographic, Systematic. An index to the genera included (with the plant family alliance of each indicated) and an index of principal geographic names conclude the volume. The service rendered to the botanists of the world by the authors, and by the sponsors, of this monumental work is above praise. The senior author's broad knowledge of the flora and the botanical literature of this area, and his well known organizational skill fit him uniquely for participation in this undertaking. Few will appreciate at once the amount of painstaking labor which has gone into its preparation. And while the cooperation of many persons has been enlisted, the reviewer became aware, during more than two years of daily association with the junior author, of the magnificently sustained attention to detail, the painstaking search, and the uncompromising insistence on accuracy, upon which rest the reliability, and the relative completeness, of the work, an appreciation of which will come, gradually, to all those who use it.

F. A. McClure

CRYPTOGAMIC BOTANY, by GILBERT M. SMITH, vol. 1, *Algae and Fungi*, vol. 2, *Bryophytes and Pteridophytes*. 8vo., cloth, 925 p., 523 illus., McGraw-Hill Book Co., N. Y. 1938. \$7.00 U. S. cy.

This latest number of the well known McGraw-Hill series of publications in the Botanical Sciences has been prepared by a professor in Stanford University, California, under the general editorship of Edmund W. Sinnott

who has supervision of the entire series, and the book endeavors to cover the general classification and the special morphology of plants below the level of seed plants. It has been written from the standpoint that a thorough knowledge of a representative series in each of the major groups is better than bits of information about a large number of plants. The classification is carried either to the order or to the family and there is a full account of the genus selected as representative of each order or family. An attempt has been made to make the space devoted to each group proportional to its complexity and diversity, and to check the natural tendency to over-emphasize particular groups in which the author might be especially interested. There is also a general classification of the distinctive characteristics of the groups considered. In some cases this has meant selection of specialized rather than generalized type of representation, but it was felt that availability of material for laboratory study might offset such disadvantage. Recent studies of both the brown and the red algae are included, and phyletic diagrams and many illustrations aid in step by step consideration of the development of the various plants under special study. Some idea of the general comprehensiveness of the work may be gained by enumeration of some of the more important sub-headings, as classification of spore-producing plants: Chlorophyta, Euglenophyta, Pyrrophyta, Chrysophyta, Phaeophyta, Cyanophyta, Rhodophyta, Myxothallophyta, Eumycetae, Phycomycetaceae, Ascomycetaceae, Basidiomycetaceae, Bryophyta, Hepaticae, Anthocerotae, Musci, Pteridophyta, Psilophytinae, Lycopodinae, Equisetinae, and Filicinae. The bibliographic matter which follows each chapter of the two volumes has been prepared to enable the student to locate the sources where there may be found a fuller discussion of the various subjects rather than as a documentation justifying the various statements, since really adequate reference to the entire literature would have involved an expansion unsuitable to a work of this kind. Wherever possible, the references selected are to journals and other works having a wide circulation.

PLANT ECOLOGY, by JOHN E. WEAVER and FREDERIC E. CLEMENTS. 2nd ed., 8vo., cloth, 160 p., 271 fig., bibliog., McGraw-Hill Book Co., N. Y., 1938. \$5.00 U. S. cy.

Advances in plant ecology have been very rapid during the past decade since the first edition of this book was published. Methods of studying vegetation have been improved, the fundamental natural units are better understood, knowledge of ecesis and invasion has been greatly advanced, and reactions and coactions are more fully comprehended. Then too, marked progress has been made in the study of the effects of light, wind and drought upon vegetation. Experimental evidence has greatly changed the concept of xerophytism; reactions, coactions, and stabilization are much better understood and are now directly applied to conservation. These are some of the reasons why it becomes desirable to issue a second edition of this work. It is the purpose of the revised edition to furnish a comprehensive treatment in accordance with present-day ecological progress and a guide to workers in the numerous related fields where an intimate knowledge of plants and plant environments, whether natural or modified by man, is fundamental to progress. Treatment of the subject includes such subdivisions as: Vegetation, its origin, development and structure; methods of studying vegetation; plant succession; units of vegetation; migration, ecesis and aggregation; competition and invasion; soil in relation to plant development; reaction and stabilization; coaction and conservation; relation of underground plant parts to environment; humidity, wind and evaporation; temperature; light; plant responses as a measure of environment; adaptation to water; plants and plant communities as indicators; and climax formations. There is also included a selected bibliography of 1035 titles most of which represent recent work on the subject. A new conception of the vast importance of climate and vegetation

in soil development has now become generally adopted. The enormous importance of a plant cover in stabilizing soil against erosion by wind and water is more fully realized. Studies of conservation of wild life have been known to hinge upon an understanding of the vegetation which furnishes food, cover and shelter for animal life. The heavy toll exacted by erosion on tilled lands must be overcome in the main by farming systems that are in harmony with the environment—the normal climatic and vegetational processes. Studies of this kind furnish materials for a more comprehensive understanding of principles and methods as regards the processes of plant succession, stabilization of climax vegetation, and the uses of plants and plant communities.

BIOCLIMATICS: A SCIENCE OF LIFE AND CLIMATE RELATIONS, by A. D. HOPKINS, formerly principal entomologist, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, and formerly entomologist and vice director, West Virginia Agricultural Experiment Station. Quarto, paper, 188 p., 162 tab. and figs., U. S. Dept. of Agri., Misc. Pub. 280, Jan. 1938.

The purpose of this publication as stated by its author, is to give results of long continued studies and researches on natural laws and principles of life and climatic relations, and on systems and methods of their applications in agricultural research and practice. It is published with the hope that specialists in different sciences will adopt such of them as may be found applicable in their several lines of work. The subjects treated are restricted largely to the bioclimatic law and allied principles, but it is pointed out that they are at the same time more or less related to all the natural sciences. Part one of this work includes discussion of the laws, principles, systems and methods of application, and these are given under such subject subdivisions as general outline and history of the science of bioclimatics, tests of principles and methods, applications in a study of special regions, applications in phenology, entomology, and general agriculture. Part two of the work treats of such factors as time, seasons, zones and zonal types and under various subdivisions the element of time in bioclimatics, length of day and night, seasons of the year, and bioclimatic zones. Consideration also has been given to such themes as classification of zonal types, general application of the laws and principles of these and their relation to major and minor physiographic types, interpretations of ranges and limits of zones and types and of the seasons and season zones by record thermal, time, and distance elements. Application has been made of the monthly mean and of phenological indices to the seasons of special regions and places, with interpretations of topographical types of the minor zones. This has been followed by a résumé of the relation of bioclimatics to other sciences as phenology, ecology, climatology, economic biology, and general agriculture. The appendix comprises a general explanation of the whole subject, schedules, tables, glossary of symbols, and list of definitions. Probably sections of the book having most interest to the economic entomologists are those where in the development of applied bioclimatics application has been made in economic entomology and includes comprehensive studies of a number of the principal insect enemies of forest trees, vegetables, fruits and farm crops. The more important results and conclusions of these studies are summarized by the author, the details being reserved for subsequent publication. Among the insects discussed are Mexican bean beetle, Codling moth, Gypsy moth, European corn borer, Mediterranean fruit fly, Periodical cicada, and Hessian fly.

HEREDITY, by A. FRANKLIN SHULL. 3d. ed., 8vo., cloth, 442 p., 168 fig., bibliog., McGraw-Hill Book Co., N. Y., 1938. \$3.50 U. S. ey.

In the preparation of the third edition of this well known, standard work on the subject an almost complete rewriting of the book has been necessitated by a combination of developments, partly of human genetics, and partly of experience. The general criterion by which a genetic phenomenon was

admitted to the first edition was the demonstration, probability, or belief of some responsible person that the phenomenon occurs in man or is involved in the economic features of some cultivated plant or domestic animal. While that criterion still partially guides the choice of topics, the number of proved and suspected genetic phenomena in the human race has grown so rapidly in recent years that the same policy would now lead to a general elementary treatise. Practically all the simpler genetic situations must be included, and some not so simple. One combination of modes of inheritance not usually presented in elementary treatises is described because a human trait has been held to rest upon it. The original purpose of the book is expressed in the free use of examples of heredity in man to illustrate genetic principles. Practically every pertinent chapter, and every discussion of a genetic principle or phenomenon, includes one or more cases in point. However, these do not replace the chapters formerly devoted to human heredity, but are in addition to them; the chapters referred to give information regarding more characters than ever before. Other extensive changes refer to exposition and sequence. Experience has indicated that there are constantly improved methods of presentation. The various subject subdivisions include treatment of such themes as: development of knowledge of genetics; fundamental structure of organisms; production of new cells; origin of new individuals; development of new individuals; mechanism of heredity; dominance; backcross and testcross; sex-linkage; multiple alleles; lethal genetic characters; interactions of genes; modification by environment; chance and heredity; linkage; proof that genes are chromosomes; non-Mendelian inheritance; determination and development of sex; heredity and evolution; inheritance of human structural characters; human heredity; physiological characters; inheritance of mental characters; practical applications of heredity; eugenics; the population problem; race problems and immigration. The appendix includes treatment of quantitative characters, questions and problems, and a selected bibliography. It is believed that the style of this new edition will be found factual, but organized.

A TEXT BOOK OF GENERAL PHYSIOLOGY, by PHILLIP H. MITCHELL. 8vo., cloth, 853 p., 201 fig., 3d ed., McGraw-Hill Book Co., N. Y., 1938. \$6.00 U. S. ey.

LABORATORY MANUAL OF GENERAL PHYSIOLOGY, by PHILIP H. MITCHELL and IVON R. TAYLOR. 8vo., cloth, 142 p., 29 fig., 1st ed., McGraw-Hill Book Co., N. Y., 1938. \$1.50 U. S. ey.

Dr. Mitchell is the Robert P. Brown Professor of Biology in Brown University, Providence, Rhode Island, and this is a revision of a work first published in 1923 and issued in a second edition in 1932. Now, in its third edition it is supplemented by a Laboratory Manual the purpose of which is greatly to widen the scope of the usefulness of the book. The work is designed for use by students who have not studied sufficiently the organic and physical chemistry that seems prerequisite to the best use of advanced works on physiology and biochemistry such as are now available. In recent years research work of the experimental biologist has made many new additions to modern physiological science, and this work and its accompanying Manual, have been designed for those who desire these essentials but who have not hitherto had sufficiently extensive preparation. The author has endeavored to describe physiological phenomena as energy transformations and to write, wherever possible, from the point of view of the law of mass action as it applies to dynamic equilibrium, as he feels that this is the only ground from which the student can truly see the rapid modern development of knowledge of the processes of life. In addition to the introductory matter, there are sections dealing with such themes as excitation and inhibition, physiology of contraction, neurones and protoneurones, reflexes and trophisms, receptors, organic and inorganic constituents of living matter, water and other electrolytes, hydrogen and hydroxyl ions, surface action,

colloidal state, physiochemical structure of living matter, diffusion and osmosis, catalysis and enzymes, digestion, chemistry of the blood and lymph, circulation and respiration, oxidations, excretion and protein metabolism, dietetics and vitamins, and the chemical regulation of internal secretions. While the Manual, which accompanies this work, was designed primarily to be used in connection with it and numerous references are made to discussions in the text book, yet it may be used equally well with other text books of general physiology. With an almost limitless number of experiments from which to select, care has been taken to include only those which had been found by experience to be workable and not too difficult but which yet were significant. These include such topics as excitation and inhibition, physiology of contraction, reflexes and trophisms, organic constituents of living matter, colloidal state, and others. The appendix comprises tables of buffer solutions, and other similar information, doses, solutions and the like for ready reference. No attempt at anything like complete bibliographies has been made in either of the volumes. This omission is not serious because extended bibliographies already exist for nearly every aspect of the subject and are no more difficult of access than are the originals. Short lists of references to monographs, review journals and treatises which contain bibliographies also are given at ends of the chapters.

OUR SHADE TREES, by EPHRAIM PORTER FELT, 12mo., cloth, 187 p., illus., Orange Judd Pub. Co., N. Y., 1938. \$2.00 U. S. cy.

While the greater portion of this book, is devoted to a popular survey, yet there is also included sufficient information pertaining to entomological and related subjects as to render the work of interest to the readers of this journal. Among those insects to which consideration has been given are the Gypsy moth, Elm leaf beetle, European elm bark beetle, Beech scale, European spruce sawfly, and Japanese beetle. The discussion of insect control includes discussion of spraying materials, contact insecticides, fungicides, repellents, spraying equipment and use of parasites. Much useful information has been brought together in compact form regarding preparation of and results to be obtained from use of nicotine or tobacco sprays, molasses-nicotine sprays, pyrethrum-rotenone combinations, miscible oils, dormant oil sprays, summer oil sprays, sulphur sprays, Bordeaux mixture, paradichlorobenzene, orthodichlorobenzene, calcium cyanide, carbon disulphide and the like. There is also a section devoted to small and large spraying equipment, woodland spraying, use of the Autogyro, the supposed destruction of insects with chemicals dissolved in the sap, and other control measures having real or fanciful value. The author is a well-known authority on forest insects.

J. S. W.

FOREST PATHOLOGY, by JOHN SHAW BOYCE, 8vo., cloth, 600 p., 216 fig., bibliog., McGraw Hill Book Co., N. Y., 1938. \$5.00 U. S. cy.

Written by the well-known Professor of Forest Pathology at Yale University, this work undertakes to give a comprehensive survey of the diseases of forest trees and of forest products and how they can be controlled. While prepared mainly for use in the United States and Canada, it will be of value to all students of the subject wherever located. The diseases are arranged largely according to the parts of the tree attacked, as seedling diseases (including nursery diseases), root diseases, foliage diseases, stem diseases, and, in addition, treatment of rots, deterioration of dead timber, and of forest products by decay and stain, and also the principles of forest disease control. It appears that the book will serve particularly well as a reference work in that a large number of selected literature citations which are closely connected with the text should make it of much value to those specialists who generally have access to adequate libraries. Some of the topics having special appeal just at this time in various parts of the world are those treating of White pine blister rust and Dutch elm disease and the

like. The part borne by insects in the transmission of various plant diseases likewise has been given due consideration and résumés of this phase of the subject will be of interest to entomologists. The appendix includes treatment of fungicides and a useful list of common names of plants used with scientific equivalents.

INSECTS OF CITRUS AND OTHER SUBTROPICAL FRUITS, by HENRY J. QUAYLE. 8vo., cloth, 583 p., 377 fig., Comstock Pub. Co., Ithaca, N. Y., 1938. \$5.00 U.S. cy.

The comments which follow concerning the above work are made from the view-point of a student of Coleoptera not that of a specialist in citrus insects. Written by a professor of entomology in the University of California and entomologist of the University of California Citrus Experiment Station, this book has a background of long and extensive experience on part of its author in control of many of the pests under discussion. Other works, issued in the past, dealing with various phases of the subject, such as Ashmead's "Orange Insects" (1880) and Hubbard's "Insects Affecting the Orange" (1885), have been out of print for many years, and it, therefore, seems well to have available a new work such as this which attempts to deal with the subject in a comprehensive way with a wide range of crops and over a practically unlimited geographical range. The general scope of the book comprises full discussion of all the more important major and minor insects and mites that attack citrus fruits and other subtropical fruits, including such as the avocado, Vinifera grape, Persian walnut, almond, pecan, fig, date, olive, Oriental persimmon, pomegranate, and sweet cherry. There are also chapters dealing with the control of rodents, nematodes and snails attacking these crops, chapters on spraying and dusting, on fumigation and on plant quarantines, and there is likewise a useful key to the principal citrus fruit insects and mites in the United States. The predaceous and parasitic insects attacking the various host insects also are given appropriate attention. To the student of a given group it is always of interest and helpfulness to have assembled in orderly compact form discussions of the insects within that group attacking given host plants. This is particularly true when, as in this case, such is accompanied by full treatment of life history and control or by a resume of such information as has been obtained thereon. To those who are interested in the Coleoptera, perhaps the most useful sections of this volume will be those dealing with the various species within that order which are considered as affecting the several hosts enumerated: the Apple root weevil (*Lepturges squallidus* Boh.), Blue-green orange beetle (*Pachnaeus citri* Mrshl.), Branch and twig borer (*Polycaon confertus* Lec.), California grape root worm (*Adoxus obscurus* Linn.), California prionus (*Prionus californicus* Mots.), Citrus bark borer (*Agrilus occipitalis* Esch.), Citrus root weevil (*Pachnaeus litus* Germar), Citrus snout beetle (*Sciodius granosus* Fahr.), Darkling ground beetle (*Metaponomus abnorme* Lec.), Dicky rice weevil (*Maleuterpes phytolimus* Oll.), and Dried fruit beetle (*Carpophilus hemipterus* Linn.). Space limitations forbid enumeration of numerous other species equally important which also are given consideration. Students of other orders of insects probably will find it of equal value to them as well. The illustrations have been well selected and conveniently grouped.

J. S. W.

THE FIGHT FOR LIFE, by PAUL DE KRUIF. 8vo., cloth, 342 p., Harcourt, Brace and Co., 1938. \$3.00 U. C. cy.

This is another book on progress in medical research by the distinguished author of "Microbe Hunters" and "Men Against Death," and continues the story of the discoveries which have made it possible to control some of mankind's most dread diseases. The story is one of epic scope and interest and the end is still far in the future. It has taken the author six years to gather the facts presented here, and most of the material is new, though a small part of it appeared in preliminary form in the "Country Gentleman."

The greater portion of the volume deals in a detailed way with some of the more recent advances made in the medical profession against maternal mortality, venereal disease, tuberculosis and infantile paralysis. These are treated separately with a wealth of facts bearing on the history and step-by-step advancement in knowledge and success which makes fascinating reading. His medical heroes are not cold impersonal scientists, but brilliantly real men. The story of the struggles of science against disease forms one of the noblest chapters in human history and any account of any of these struggles presented as does this author becomes an exhilarating and valuable addition to our scientific literature.

FIFTY YEARS A COUNTRY DOCTOR, by WILLIAM N. MACARTNEY, M. D. 8vo., cloth, 584 p., illus., E. P. Dutton & Co., N. Y., 1938. \$3.50 U. S. cy.

This is an autobiography of a physician whose life work for over half a century included practice over a considerable area of northern New York State, French Canadian farmers and small-town folks, and a community of Indians on a nearby reservation. It contains information which would be to all medical workers wherever located. There are more than sixty brief chapters in which the author summarizes his personal medical views based on long experience concerning diseases, drugs, fads and superstitions, many of these enlivened with incidents and experiences some of which are of dramatic interest.

THE BABY GIANT PANDA, by RUTH HARKNESS. small 8vo., 126 p., illus., Carrick and Evans, N. Y., 1938. \$2.00 U. S. cy.

This little book is a continuation of and a more detailed account of the author's explorations in western China and the capture and subsequent adventures with that first specimen of a rare animal family ever to be captured. The former volume entitled THE LADY AND THE PANDA by the same author has already been reviewed in the "Lingnan Science Journal" (vol. 17, no. 2, p. 266). The tiny animal, weighing less than three pounds, was found in the trunk of a hollow tree in the wilds of a remote section of western China, and after a long series of difficulties was brought back alive to a zoo in Chicago. The value of this book is considerably enhanced by the unusual excellence of the illustrations which are reproductions of particularly interesting and valuable photographs made during various phases of the expedition.

WONDERS OF THE GREAT BARRIER REEF, by T. C. ROUGHLEY. 8vo., cloth, 282 p., 50 illus. in natural colors, 32 black and white figs. Angus and Robertson, Ltd., Sydney, Australia, 1937. 12 shillings 6 pence.

Written by the distinguished president of the Royal Zoological Society of New South Wales, this volume treats of one of the great natural wonders of the world, the Great Barrier Reef of Australia. The story of the work of the tiny coral polyps responsible for the 1250 miles of coral islands, is amazing enough, but the habits of much of the animal life associated with the reef are almost incredibly wonderful. Marine animals which elsewhere are small and inconspicuous may grow here to be giants of their race; those which are drab and unattractive elsewhere may be seen in the most brilliant of colors. In fact, the colorful life of the reef is considered one of its greatest attractions. For this reason the author has used natural-color photographs to illustrate the book. These were reproduced from Lumiere autochromes made of the objects while beneath the water in natural positions. Scientific terms have been avoided, but the needs of professional reader are served by the inclusion of a glossary indicating the principal references. An idea of the general scope of the work may be gained by an enumeration of some of the subject subdivisions as: Journey to the reef; first impressions of a coral island; twelve hundred miles of coral; nature and varieties of coral; reef flowers, sea-stars, sea-urchins, beche-de-mer, and crabs and their allies;

shell fish and queer fish; exploration of some of the islands; sea birds; fish and fishing; and flotsam and jetsam. An especially helpful feature is the inclusion of a good map showing the exact location of the Great Reef and its relation in position to other land areas in the Southern and Eastern hemispheres.

PLANT HUNTER'S PARADISE, by F. KINGDON WARD, 8vo., cloth, 347 p., 12 illus., 2 maps, Macmillan Company, N. Y., 1938. \$3.50 U. S. cy.

This is another book on Asiatic exploration by the distinguished author of "A Plant Hunter in Tibet," "From China to Ékamti Long," "The Loon of the East," and others. It includes accounts of the explorations of the author in 1922 and 1926, also in 1930-31 in far northern Burma and the sources of the Irrawaddy. It likewise contains a detailed narration of his expedition in 1930-31 to Katha and Naba, via Myitkyina, Wehsı, Sumpra Bum, Fort Hertz and the Nam Taman into the area between Rima Yurgan Pass in Northern Burma and its adjacent regions. While of primary interest to students of botany, it also contains much worth while information on numerous other phases of natural history, notably on birds, mammals, and the like. Some of the sections likewise will be of value to the student of Asiatic ethnology. Pleasingly written in a semi-popular vein, the chapters include treatment of such themes as: The road to Myitkyina; Where Burma ends; Trials of the modern explorer; Native customs of the Darus; A bird paradise; Spring comes to the Adung valley; The road to Tibet; The mystery of the Irrawaddy, and others. An appendix includes discussion of weather and climate of northern Burma, the zoological specimens collected on the Upper Irrawaddy—mammals, birds, reptiles, amphibians and insects, and a detailed list of the plants introduced into England from far northern Burma.

COMMON MARINE FOOD-FISHES OF HONG KONG, by G. A. C. HENKLOTS and S. Y. LIN, 40 species described in English and Chinese (with European and Chinese recipes) 75 p., 41 drawings, published by the senior author, the University, Hong Kong. \$2.50 H.K. cy.

Each species is treated in the same manner, namely, an illustration, scientific name, common name, English and Chinese description, distribution, seasons, retail price, and food value. This material is preceded by an introductory chapter including some very useful information. Recipes are given for twelve ways of cooking fish Chinese style and seventeen European recipes. The book is bi-lingual throughout and is indexed according to Chinese names and Romanized names. The species treated are as follows: *Nematalosa nasus* (Bloch), *Ilisha elongata* (Bennett), *Hilsa reevesii* (Richardson), *Sardinella aurita* (Cuv. & Val.), *Cybium sinensis* (Lacépède), *Cymbium koraenum* (Kishinouye), *Decapterus lajang* (Bleeker), *Apolectus niger* (Bloch), *Pampus argenteus* (Euphrasen), *Trachinotus blochii* (Lacépède), *Drepane punctata* (Richardson), *Lateslabrax japonicus* (Cuvier and Valenciennes), *Lates calcarifer* (Bloch), *Serranus megachir* (Richardson), *Serranus awo-ara* (Schlegel), *Serranus aka-ara* (Schlegel), *Serranus fario* (Thunberg), *Lutjanus fulviflamma* (Forskal), *Lutjanus erythropterus* (Bloch), *Pomadasys hasta* (Bloch), *Plectrohynchus cinctus* (Schlegel), *Pagrosomus major* (Schlegel), *Taius tumifrons* (Schlegel), *Sparus latuſ* (Houttuyn), *Sparus berda* (Forskal), *Synagris virgatus* (Houttuyn), *Pseudoxcena crocea* (Richardson), *Nibea diacanthus* (Lacépède), *Argyronomus japonicus* (Schlegel), *Sillago maculata* (Quoy and Gaimard), *Cynoglossus sinicus* (Wu), *Trulla abbreviata* (Gray), *Tephritis sinensis* (Lacépède), *Pseudorhombus arsius* (Buchanan-Hamilton), *Paralichthys olivaceus* (Schlegel), *Mugil longimannus* (Gunther), *Eleutheronema tetradactylus* (Shaw), *Callyodon limbatus* (Cuvier and Valenciennes), *Branchiostegus japonicus* (Houttuyn), and *Muraenesox arabicus* (Bloch and Schneider).

W. E. HOFFMANN

ABSTRACTS AND REVIEWS

An attempt is made to notice, abstract, or review articles and publications dealing with the biological and physical sciences in China. Articles in these fields which do not pertain specifically to China but contain information of interest and value to scientists and others in China are also included. Although this abstract service is maintained primarily for the benefit of people in China (where scientific literature is not plentiful) it is hoped that it will also be of service to those in other countries who are interested in following the progress of science in China.

Obviously we can make mention of or abstract only such literature as comes to the attention of the editors who, accordingly, will appreciate receiving literature for this purpose. Literature thus received is placed in Lingnan University Library.

Alexander, Charles P. New or little-known Tipulidae from eastern China. Part II. *Notes Ent. Chinoise (Mus. Heude)* 4(5):65-88, 14 fig., 1937.—This instalment is devoted to the subfamilies Cylindrotominae and Limoniinae and includes 23 species, mostly from Kuling, N. Kiangsi. *Limonia (Geranomyia) kiangsiana*, L. (*Dicranomyia lassa*, *Dicranoptyla phallosomica*, *Nipponomyia kulingensis*, *Limnophila (Elaeophila) paraprivila*, *Heratoma (H.) kiangsiana*, H. (*Eriocera sycophanta*, H. (*E.) pieli*, H. (*E.) regina*, H. (*E.) posticata* are new to science.

Anonymous. Survey on Chinese wool. I. On the quality of Shantung wool. (In Japanese with English title.) *Bull. Imp. Zootech. Expt. Sta.*, No. 29, 8 p., 4 pl., 1938.

Baba, Kikutaro. Opisthobranchia of Japan (I). *Jour. Dept. Agri. Kyushu Imp. Univ.* 5(4):195-236, 1 colored pl., 12 fig., 1937.—A total of 73 species of Opisthobranchia are known from Japanese and Formosan waters of which 33 are treated in this section of the revision. The fauna has several littoral species in common with the Atlantic and Mediterranean faunas, is closely related to the faunas of the Red Sea and the Indo-Pacific, not entirely distinct from the fauna of Pacific N. America. Three new species are described.

Bernhauer, Max. Neuheiten der Staphylinidenfauna der Mandschurei. *Koleopt. Runds.* 24(1-2):20-29, 1938.—The following new species are described: *Trogophloeus (Tuenosoma) manchuricus*, *Bolitobius ruficeps*, *Conosoma Alexandrovi*, *C. pseudolitoreum*, *Tachyporus Alerandrovi*, *Tachyporus Kaiseri*, *T. manchuricus*, *Tachinus excellens*, *Gyrophaena Kaiserii*, *G. Alexandrovi*, *G. bicarinella*, *G. vulnerata*, *G. manchurica*, *Tachysa (Ischnopoda) manchurica*, *T. orientis*, *Atheta (Microdota) Alexandrovi*, *A. (M.) laticauda*, *A. (Acrotona) manchurica*.

Boschma, H. The species of the genus *Sacculina* (Crustacea Rhizocephala). *Zool. Meded. (Leiden)* 19(3-4):187-328, 96 tert fig., 1937.—A taxonomic revision is given. There is a key to the 75 "sufficiently known" species of the genus. From the Chinese region are described *Sacculina gibba* Boschma, near Foochow, *Sacculina sinensis* Boschma from Hong Kong, and *S. plana* Boschma from Formosa.

Careshe, L. Une noctuelle polyphage, *Prodenia litura* Fab. *Bull. écon. Indochine* 40(3):517-537, 3 pl., 1937.—A detailed account is given of observations on the bionomics of *P. litura* in Indo-China and all stages are described. A large number of food-plants are attacked and particular damage is done to castor and tobacco. The females begin to oviposit 2-3 days after emergence and lay their eggs in batches on the lower surface of the leaves, generally towards the center of the plant. In the laboratory, they laid 6-9 batches, each of about 300 eggs, and lived for 5-11 days. The egg, larval and pupal stages lasted 24-7, 11-26 and 7-11 days, respectively. There were usually 6 larval instars, but sometimes 2 supplementary ones were intercalated between the 5th and 6th. There are 8-10 generations a year in Tongking and 11-12 in

Cochin China. Newly hatched larvae were very susceptible to dry heat, which caused a high mortality. Two Braconid parasites were found in Tongking. A Hymenopterous and a Tachinid parasite were observed in Cochin China; larvae were also attacked by a polyhedral disease. Methods of control include hand-picking of the larvae and the leaves on which the eggs are laid. Sprays of barium fluosilicate or lead arsenate should be applied in the rainy season and a dust of barium fluosilicate and talc (2:3), applied every 3 weeks to tobacco in the dry season.

REV. APPL. ENT.

Chang, K. S. Francis. Some new Acridids from Szechwan and Szechwan-Tibetan border (Orthoptera: Acrididae). *Notes Ent. Chinoise (Mus. Heude)* 4(8) :177-198, 2 pl., 1937.—Seven acridid species and one allotype which are new to science are described and figured. They are *Chorthippus grahami*, *Euchorthippus weichowensis*, *Oreopterygonotus uvarovi*, *Ptygonotus guineyi*, *Conophymacris szechwanensis*, *Tonkinicris sinensis*, *Euprepocnemis yunkweiensis* (n. spp.), and *Habrocnemis sinensis* Uvarov.

Chen, Lawrence. The Japanese and the Chinese fishing industry. *Information Bulletin* (Nanking) 4(4) :73-92, 1 tab., 1937.—The methods of Chinese marine fishermen are described as are also the operation of the fish hongs. Lack of capital and sufficient up-to-date equipment puts the Chinese fishermen at a great disadvantage and many of them are in a desperate condition. Their condition is made much worse by extensive poaching on the part of Japanese fishermen who have modern equipment, are frequently well armed, and have governmental subsidies and other backing. Chinese fishing gear is often deliberately destroyed and even the vessels themselves destroyed. This refers to 1937 and for a long period prior to this and does not include the present orgy of indiscriminate murder of Chinese fishermen on an enormous scale.

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Chevalier, A. Sur un groupe de plantes insecticides; les *Stemon* d'Indochine. *Rev. Bot. appl.* 17 :136-137, 1937.—About 35 species are known (Stemonaceae) of these tuberous rooted monocotyledons, mostly from the eastern tropics, of which those known to possess insecticidal properties are *S. tuberosa* Lour., *S. sessilifolia* (Miq) Franch and Sav., *S. Collinsae* Craib., *S. Burkili* Prain, *S. moluccana* (Blum) C. H. Wright. The preparations are obtained by powdering the roots and are as yet little known.

HORTICULTURAL ABSTRACTS

Chujo, Michio. H. Sauter's Formosa collection: subfamily Galerucinae (Coleoptera: Chrysomelidae). *Arb. morph. tax. Ent. Berlin-Dahlem* 5(2) :135-152, 4 fig., 1938.—In this section 27 species (13 new to science) are treated. Many of the species are also reported from China proper. The new species are: *Cneorane cyanipennis*, *Morphosphaera bimaculata*, *Luperodes bicoloripennis*, *Arthrotus fulvus*, *Dercetis taiwana*, *Gallerucida sauteri*, *Monolepta excavata*, *M. gracilipes*, *M. horni*, *M. longitarsoides*, *M. minor*, *M. rufofulva*, and *M. sexlineata*.

Colbert, Edwin H. The panda: a study in emigration. *Nat. Hist.* 42(1) :33-39, 3 fig., 1 chart, 1938.—A study of the anatomy and of the fossil ancestors indicates that the pandas descended from a raccoon-like ancestor. It is believed that some of the raccoons migrated from their original home in the Great Plains region of North America to northern Asia by way of a land connection across the Bering Straits during the upper Miocene and Pliocene times; that the resemblance of the giant panda to the bears is the result of convergence, not of familial connection.

Cooman, P. A. de. Etude sur les genres *Paromalus* Er. et *Eulomalus* n. g. (Col. Histeridae) avec descriptions d'espèces nouvelles. *Notes Ent. Chinoise (Mus. Heude)* 4(6) :89-107, 43 fig., 1937.—A taxonomic study was made of the two genera. Keys are given to the 21 species of the new genus *Eulomalus* and to the 45 species of *Paromalus*. Each species is

described. *E. vermicipygus*, *E. pupulus*, and *E. mimulus*, all n. spp., are from Tongking. Thirteen species of *Paromalus*, including the new species *P. zypii*, *P. cincticauda*, *P. sinuaticeps*, *P. pseudosuturalis*, *P. nudipectus*, *P. tonkinensis*, and *P. torquiculus*, are from Indo-China. *P. mendicus* Lewis is from China and *P. sauteri* Bickh. from Formosa.

Eguchi, M. Observations on *Aphis gossypii* Glov. and results of control experiments. *Ann. Agric. Expt. Sta. Chosen* 9(3) :379-416, 5 pl., 1937.—*Aphis gossypii* Glov. is one of the most serious pests of cotton in Korea, where it also attacks *Hibiscus* spp., pomegranate (*Punica granatum*), cucumber, *Chrysanthemum*, *Portulaca oleracea* and other plants. The life history is described and food plants and enemies are listed. Spraying cotton twice in June with a proprietary derris insecticide mixed with soap has been found very effective for control. Lime-sulphur should be applied in winter to trees on which eggs are laid.

FROM REV. APPL. ENT.

Faust, Ernest Carroll. Larval flukes associated with the cercariae of *Clonorchis sinensis* in bithynoid snails in China and adjacent territory. *Parasitology* 22(2) :145-155, 5 pl., 1930.—Adolescaria (the encysted stage) of the fluke *C. sinensis* are present in practically every species of fresh water fish in eastern Asia from Korea to Indo-China; and any mammal which eats the uncooked host may become infested. The mollusk hosts in this area comprise the Sino-Japanese Bithyinae—*Parafossarulus striatulus*, *P. s.* var. *japonicus* Pils., *P. sinensis*, *Bithynia fuchsiana* Von Moll, and *B. longicornis* Benson. Eleven new species of larval flukes were also found in these mollusks.

FROM BIOLOGICAL ABSTRACTS

Fischer, C. E. C. Plants new to Assam: X. *Kew Bull. Misc. Inform.* 1938(5) :210-213, 1938.—*Craibiodendron Henryi* Smith [Ericaceae] is also recorded from W. China, *Jasminum dumicola* Smith [Oleaceae] from Yunnan, and *Trachelospermum auritum* Schneid. [Apocynaceae] from Yunnan, *Ehretia macrophylla* Wall. [Boraginaceae] from W. China, *Lycopsis arvensis* Linn. [Boraginaceae] from Tibet, *Pogostemon nigrescens* Dunn [Labiate] from Yunnan, *Alseodaphne dumicola* Smith [Lauraceae] from W. China, and *Phyllophax galeandra* (Rehb. f.) Schltr. [Orchidaceae] from W. China.

Frey, Richard. Hybotinen (Dipt., Empididae) von Formosa und den Philippinen. *Notulae Ent.* 18(2) :52-62, 1938.—Listed are 22 species of *Syneches* Walk. (6 from Formosa), 3 of *Hybos* Meig. (2 from Formosa), 4 of *Syndyas* Lw. (1 from Formosa). New forms from Formosa are: *Syneches Hornii*, *S. simplicipes* var. *minutulus*, and *Syndyas orientalis*.

Gebien, H. Vorbemerkungen zum Katalog der Tenebrioniden. *Mitteil. Munch. Ent. Ges.* 23(1) :49-80, 1938.—A catalog is given of the tribes, Eleodini, Platyscelini, Geopini, Stizopini, Physogasterini, Praecini, Branchini, and Coniontini, species numbers 4839-5297. *Platyscelis sinensis* Friv. and *P. subaenescens* Sch. are from China, *P. punctatissima* F. and *P. Provosti* F. from Peking, and *Myatis quadricollis* B. and *M. variabilis* B. from Chinese Turkestan.

Gressitt, J. Linsley. A new burrowing frog and a new lizard from Hainan Island. *Proc. Biol. Soc. Wash.* 51 :127-130, 1938.—*Kaloula pulchra hainana* n. subsp. related to *K. p. pulchra*, and *Platyplacopus kuehnei carinatus* n. subsp. are described.

Gressitt, J. Linsley. New longicorn beetles from Formosa, IV: (Coleoptera: Cerambycidae). *Phil. Jour. Sci.* 65(3) :147-174, 1 pl., 1 text fig., 1938.—The subfamilies Prioninae, Cerambycinae, and Lamiinae are treated. Fifteen new species or subspecies are described as follows: *Macroctoma fisheri* subsp. *formosae*, *M. katoi*, *Epanus subglabra*, *Dolephrades subdenudatus*, *Monochamus fascioguttatus*, *Dithannus permutans* subsp.

paucipunctatus, *Falsomesosella horishana*, *F. subalba*, *Euseboides matsudai*, *Clytosemia bicincta*, *Roridibilis femoratus*, *Miaenia granulicollis*, *Exocentrus testudineus* subsp. *brevisetosus*, *Serixia griseipenne*, *S. subsericea*. Keys are given to Formosan species of each species discussed. Synonymic notes are given on several species.

Gschwendtner, L. Die Rassen des *Cybister tripunctatus* Oliv. *Koleopt. Runds.* 24(1-2) :14-19, 9 text fig., 1938.—The genitalia of the various subspecies, including *orientalis* Gschw. from China, are described and figured.

Herklotz, G. A. C. Tigress at Tai Po. *Hong Kong Nat.* 1(1) :41, 1930.—A recent record near Hong Kong. **BIOLOGICAL ABSTRACTS**

Herklotz, G. A. C., and Gibbs, L. The ferns of Hong Kong Part I. *Hong Kong Nat.* 1(1) :17-23, 5 pl., 3 fig., 1930.—In this region ferns are about one tenth as numerous as the species of flowering plants. Climate and soil are favorable for their development. Seven types of local habitats are described. Part I treats of 7 species belonging to the Ophioglossaceae, Marattiaceae, and Osmundaceae, with descriptions, figures, and distributional notes. **BIOLOGICAL ABSTRACTS**

Höne, Hermann. Brief aus China. *Ent. Runds.* 55(33) :385-388; 55(36) :413-415, 1938.

Howard, L. O. Edward Sylvester Morse 1838-1925. *Biogr. Mem. Nat. Acad. Sci.* 17 :3-29, portrait, 1937.

Hu, C. C. The variety and distribution of pears in China. (In Japanese with English summary.) *Jour. Hort. Assoc. Japan* 8 :235-51, 1937.—Cultivated pears in China belong to the following species: Tsiu Tzu Li (*Pyrus ussuriensis* Maximowicz), Pei Li (*Pyrus Breitschneideri* Rehder) and Sha Li (*Pyrus serotina* Rehder). The first group is adapted to cold, dry regions and is found in the provinces of Fengtein, Kirin and Hopei. The Pei Li group is less resistant to cold and drought than the Tsiu Tzu Li group. Pei Li varieties are mainly distributed throughout the provinces of Honan, Hopei and Shantung. The last group, Sha Li, is adapted to mild and wet regions and is mainly found along the rivers Yangtze and Chukiang. A key for determining the Chinese cultivated pear varieties is given and wild pear species used as rootstocks are named. These are *P. betulaefolia* Bunge, *P. Calleryana* Decaisne, *P. serrulata* Rehder, *P. phaeocarpa* Rehder, *P. serotina* Rehder, and *P. ussuriensis* Maximowicz. **HORTICULTURAL ABSTRACTS**

Jackson, R. B. A guide to the identification of the Anopheline mosquitoes of the Colony of Hong Kong. *Chinese Med. Jour.* 53(6) :563-576, 2 pl., 1938.—Anopheline mosquitoes are briefly described. Notes are given on the habits of anophelines of the Colony, the most important mosquitoes being *A. maculatus* Theobald, *A. hyrcanus* var. *sinensis* Wied., *A. jeyporensis* var. *candidiensis* Koidz., *A. splendidus* Koidz., and *A. tessellatus* Theobald. Appendages of the various species are diagrammed.

Kitamura, Siro. Expositiones plantarum novarum orientali-Asiaticarum 3. *Acta Phytotax. Geobot.* 7(2) :63-71, 1938.—Eleven species and subspecies are described in Latin and Japanese. *Artemisia* (*Abrotanum*) *Saitoana* n. sp. and *A. (A.) Iwayomogi* n. n. are from Korea and Japan; *A. sacrorum* subsp. *manshurica* n. subsp. from Korea, Manchuria, Mongolia and China; *A. s.* var. *vestita* (Komarov) n. comb. from Korea, Manchuria, Mongolia; *Atractulodes chinensis* (Bunge) is from China and Manchuria; *Carpecium divaricatum* Sieb. & Zucc. from Kwangtung; *Chrysanthemum Namikawanum* Kitamura from Manchuria.

Koldzumi, G. Contributions ad cognitionem florum Asiae orientalis. *Acta Phytotax. Geobot.* 7(2) :112-117, 1938.—Fourteen species (10

new) are described in Latin and Japanese. All are from Japan except *Viola takasagoensis* n. sp. which is from Formosa.

Kondo, M., Takahashi, R., Terasaka, Y., and Isshiki, S. Literatur-Verzeichnis über Reis und Reiskultur. II. Ber. Ohara Inst. Landwirt. Forsch. 7(4):573-594, 1937.—A bibliography of rice and rice culture.

Koreishi, K. Morphology and life-history of the melon fly in Formosa. (In Japanese with English summary). Res. Bull. Pt. Quar. Sta. Formosa, no. 2, 74 p., 5 pl., 1937.—*Dacus (Chaetodacus) cucurbitae* Coq., all stages of which are described, is very injurious to cucurbits, especially cucumber, melon and *Luffa cylindrica*, in Formosa. It has 8 or 9 generations a year and is most abundant from June to August. The fruits are infested only when young. The adults live for long periods, some surviving for 381 days in captivity. The intervals between emergence and pairing or oviposition vary with the time of year. The flies oviposit daily in summer, but lay no eggs in winter if the temperature is below 15°C. Females emerging in April and June produced averages of 816 and 1,043 eggs, respectively. The egg, larval and pupal stages lasted about 1, 3-4 and 7 days, respectively, in summer and 3-4, 12-20 and 28-32 days in January and February. The percentage of eggs that hatch was much reduced at low temperatures. REV. APPL. ENT.

Koumans, F. P. Notes on Gobiodid fishes 8. Further notes on the synonymy of species of Gobioidea. Zool. Meded. (Leiden) 19(3-4): 177-179, 1937.—Five species are treated. "The specimens *Gobius chinensis* Osbeck, named by Gunther, Cat. Fishes III, 1861, p. 37, a, b. Adult, China, belong to *Acentrogobius viridipunctatus* (C. & V.)."

Kubo, Ituo. On the Japanese atyid shrimps. Jour. Imp. Fish. Inst. 33(1):67-100, 24 fig., 2 tab., 1938.—Descriptions, keys and distribution records are given for the 12 species of the 4 genera (*Paratya*, *Neocaridina* n. gen., *Caridina*, and *Atya*) occurring in the Japanese Empire. Among other records are those of *Paratya compressa* (de Haan) from Korea, *Neocaridina denticulata* de Haan from Korea and Peking, *N. d. sinensis* (Kemp) from Formosa and Peking, and *N. d. koreana* n. subsp., endemic in Korea.

Kurotchkin, T. J. The cultivation of mushroom, *Agaricus campestris*, in north China with special reference to the preparation of spawn. Peking Nat. Hist. Bull. 12(4):279-284, 2 pl., 1938.—The preparation of a satisfactory compost required greater care than it is usually stated in the literature, since the local manure is easily decomposed. The best result in the growing of mushrooms in Peking is obtained by employing fresh pure culture spawn locally produced. In the preparation of the spawn, the use of gills of a fresh mushroom is found to be a rapid and easy method for isolating mycelium in pure culture. This can be done through the use of the elementary bacteriological technic described.

AUTHOR'S CONCLUSIONS

Leene, Jentina E. Notes on *Charybdis demani* nov. spec., *Charybdis variegata* var. *brevispinosa* nov. var. and other *Charybdis*-species. Zool. Meded. (Leiden) 19(3-4):165-176, 4 fig., 2 tab., 1937.—Descriptions and measurements are given for 6 species. Among them is *C. (Gonio-soma) variegata* (Fabr.) from Amoy.

Lhoste, Jean. Étude de quelques Scydmaenidae des rives de l'Océan Indien. Arb. morph. tax. Berlin-Dahlem 5(2):109-127, 25 fig., 1938.—Included are *Scydmaenus curinatosternalis* n. sp. and *S. hoabinhensis* n. sp. from Tongking.

Li and Kao, 李鍾忠·高平子. Eclipse de soleil observations faites à l'observatoire du mont Pourpre le 19 Juin 1936. Reprint No. 4, Nat. Res. Inst. Astron. Acad. Sinica, 5 p., 1 pl., 1 fig., 1936.—The eclipse

lasted about 17 minutes, 25.6 seconds. Photographs were made. Five protuberances of various densities, seen with a spectrohelioscope, were also observed on photographs taken in Japan during the total eclipse.

Limber, D. P. Notes on the hot-water treatment of *Anguina tritici* galls on wheat and a comparison of an Indian and a Chinese collection by use of weight criteria. *Proc. Helminth. Soc. Wash.* 5(1):20-23, 1938.—Limber finds that in wheat galls of Indian origin the larvae of *Anguina tritici* are, on the average, fewer in number and somewhat larger in size than larvae from galls of Chinese origin. The walls of the Chinese galls are slightly thinner than the Indian ones. He reports that in the hot-water treatment of galls, soaked in water for 2 hours prior to treatment, a temperature of 122° F. for 30 minutes is necessary to kill the larvae.
T. G. in HELMINTH. ABST.

Marshall, Guy A. K. On some Oriental Cossoninae. *Arb. morph. tar. Ent. Berlin-Dahlem* 5(2):153-164, 1938.—*Eutornus planatus* n. sp. is described from Annam.

Matsumoto, K., and Kiyama, R. On *Bruchidius terrenus* Sharp again. *Jour. Plant Prot.* 25(2):109-111, 1938.—*Bruchus (Bruchidius) notatus* Chujo, which has been misidentified as *B. (B.) terrenus* Sharp, has been found in seeds of *Acacia confusa* from Formosa.
REV. APPL. ENT.

Mei, P. F., and Chou, T. Q. Two poisonous plants, *Huang-t'eng* and *Tsan-chung-yao* and their identification. *Chinese Med. Jour.* 54(1): 37-39, 1938.—Botanical identification has not been made but the two plants seem to be similar to each other and to *Lei-kung-t'eng*. The 3 plants may be identical. Tripterine [$C_2H_5O_3$] and dulcitol [$CH_2OH \cdot (CHOH)_4 \cdot CH_2OH$] have been isolated from all three.

Miao, C. P., 苗久蘋. Study of some forest insects of Nanking and its vicinity. (In Chinese with English summary.) *Science* 22(5 & 6): 183-218, 1938.—Three species of forest insects, namely *Lebeda nobilis* Walker, *Bhima idiota* (Graes), and *Papilio rutherfordi* L., are treated. The distribution, food plants, economic importance, life history and habit, and descriptions of different stages are given; most stages and wing-venation of all three species are figured. The setal maps of the caterpillars are also given. In 1934, *L. nobilis* and *B. idiota* were found as the pests of young oak-trees, usually defoliating the trees, at Niu-Shou-Shan and Pao-Hwo-Shan. In 1935, the caterpillars were found rather rare, especially at Pao-Hwo-Shan. But in 1936, they were found abundant at the above-mentioned localities.

Miyadi, Denzaburo. Ecological studies on marine relics and land-locked animals in inland waters of Nippon. *Phil. Jour. Sci.* 65(3):239-250, 2 fig., 1 tab., 1938.—Marine relics discussed include *Exosphaeroma oregonensis* Dana [Isopoda], which was first described from brackish water near Shanghai, and *Sinocalanus tenellus* (Kikuchi) [Copepoda], which also occurs in China. *Oncorhynchus masou* Brevoort [Salmonidae] is land-locked in Formosa. Morphological and ecological features of marine animals in fresh-water habitats and the geography of relic lakes are discussed.

Moriyama, T. On the abstract to literature of paddy and rice in Formosa. (In Japanese with English title.) *Formosan Agri. Rev.*, No. 381, p. 443-461, 1938.

Murayama, J. Studies on Lamellicorns in Korea. (In Japanese.) *Rept. Jap. Assoc. Adv. Sci.* 13(2):259-264, 1938.—The Lamellicorns occurring in Korea comprise 123 species. Of about 20,000 adults collected during a period of 5 years, 32% were *Lachnostenus (Holotrichia) diomphalia* Bates, 14% *L. (H.) titanis* Reitt., 9.7% *Miridiba koreana* Niij. & Kino, and 0.11% *Anomala (Phyllopertha) pallidipennis* Reitt., while of about 10,000 larvae

collected in nurseries during 6 years, 53% were *A. pallidipennis* and 15% *L. diomphalia*. A table is given showing the emergence periods of adults of 14 common species. *A. pallidipennis*, *Aserica (Serica) orientalis* Motsch., and *Mimela (Anomala) testaceipes* Motsch., complete a life-cycle in a year, and *L. diomphalia* completes it in 2 years. In Korea, the ground freezes in winter to a depth of 20-28 in.; larvae of *A. pallidipennis* and adults of *L. diomphalia* were found hibernating in the frozen soil, while the larvae of *L. diomphalia* and *M. testaceipes* were found in deeper unfrozen soil. The third-instar larvae of *L. diomphalia* survive submersion in water for 2 days, but the larvae of *L. titanis* are killed when submerged for 1 day. The prepupal stage is the critical period in the life-cycle of these insects, and is easiest to control with soil fumigants (carbon bisulphide or an emulsion of it, or paradichlorobenzene) or by mechanical methods. Collecting the larvae in the autumn before they enter the deeper soil is also recommended.

REV. APPL. ENT.

Nanta. Note préliminaire sur les propriétés insecticides du *Stemona tuberosa*. *Bull. écon. Indochine* 40(3):539-542, 1 pl., 1937.

Okada, Ichiji. Die von Herrn K. Takeuchi aus Japan gesammelten Nematoceren. *Tenthredo* 2(1):33-43, 1 pl., 2 fig., 1938.—Bibliographical references, descriptive notes, and distribution records are given for 19 species of Nematocera. The families Fungivoridae, Lycoriidae, Pachyneuridae, Phryneidae, and Bibionidae are represented. The new form *Zelmira annandalei* f. *formosana* is described from Formosa; *Pachyneura fasciata* Zetterstedt is reported from Formosa; *Phryne japonica* (Mats.) from Korea; *Plecia velutina* (Loew) from China; and *Penthetria melanaspis* Wied. from China and Korea.

Okada, I. Oviposition of *Grapholitha glycinvorella* Mats. in relation to some legumes. (Prelim. rept.) *Oyo Dobuts. Zasshi* 10(1):8-17, 4 fig., 1938.—Soy bean is the only plant attacked by larvae of *Cydia (Grapholitha) glycinvorella* Mats., in Hokkaido and Manchuria, but in experiments in Manchuria, females oviposited, though less readily, on pods of *Lupinus perennis*. They did not oviposit on some other leguminous plants and probably did so on *Lupinus* because its pods are hairy, as they are known to prefer the hairy varieties of soy bean.

REV. APPL. ENT.

Okada, I. On *Scatopse fuscipes* Meigen injuring the edible fungus, *Armillaria matsutake* Ito et Imai. (In Japanese.) *Mushi* 11(1):16-18, 1 fig., 1938.—A description is given of *S. fuscipes* in Japan and Korea.

FROM REV. APPL. ENT.

Okada, Yaichiro. The ecological studies of the frogs with special reference to their feeding habits. *Jour. Imp. Agri. Expt. Sta.* 3(2):275-350, 22 pl., 17 tab., 1938.—Discussion is largely confined to those of the 54 frogs of the Japanese Empire which are related to agriculture. Two of these species, *Rana nigromaculata nigromaculata* Hallowell and *R. n. chosenica*, occur in Korea; *Rana tigrina*, *R. planctyi*, *R. rugulosa*, *R. limnocharis*, *Bufo melanostictus*, and *Microhyla fissipes* in Formosa. Ecology is discussed under the headings: Habitat, Hibernation and summer sleep, Breeding habits, Frogs in relation to other animals, Feeding habits of the adult frog. Lists are given showing numbers and other kinds of food eaten by adults and tadpoles. Mention is made of use of frogs as food and medicine. The plates contain many excellent photographs showing habitats and development of various species.

Oozi, Y. On *Phyllocnistis citrella* Stainton. (In Japanese.) *Ent. World* 6(49):223-228, 1 pl., 1938.—*P. citrella*, all stages of which are described, occurs in SW. Japan, the Loochoo Is., and Formosa, and attacks various species of *Citrus*. It is most injurious in mid-summer and autumn, damaging the young leaves, especially of young trees. In Kyushu, the adults

are present from mid-May to early November, and there seem to be at least 6 generations a year. In May, the larval and pupal stages last 9 and 10 days, respectively, the life-cycle being completed in about 25 days.

REV. APPL. ENT.

Pic, M. Coléoptères nouveaux de Chine. *Notes Ent. Chinoise (Mus. Heude)* 4(7):169-176, 1937.—*Lycostomus sublineatus* and *Lyponia Pieli* [Lycidae] are from Chekiang; *Lucidina Vitalisi* var. *trinotaticollis* [Lampyridae] from Tienmushan; *Themus atripes*, *Athemus cinctiventris* and *A. Pieli* [all Cantharini] from Chekiang; *A. testaceipes*, *Cantharis bimaculatocollis* [Cantharini] from Tienmushan; *Lycocerus Pieli* [Malacoderme] and *Malochius sinuaticollis* var. *Moutoni* [Malachiidae] are from Chekiang; *M. Savioi* from Kiangsu; *Cteniopinus diversipes* [Hétéromère] from Chekiang; *Borboresthes faunensis* var. *diversicollis* [Hétéromère] from Chusan; *Allacula Pieli* [Hétéromère] from Kiangsi; *Cryogeton impressipenne* [Hétéromère] and *Plesiophthalmus Pieli* [Hétéromère] are from Tienmushan; *Claridea Pieli* and *C. nigro-suturalis* [Phytophaga] are from Chekiang. All are new to science.

Piper, C. V., and Morse, W. J. The velvetbean. *Farm. Bull. U. S. D. A.*, No. 1276, 21 p., 1938.—Several varieties, including *Stizolobium cochinchinensis*, the Chinese velvetbean, have been successfully introduced as a forage crop into the southern U.S.A.

Saito, K. On the oviposition and feeding habits of *Ithon mirabilis* Motsch. *Oyo Dobutsu Zasshi* 10(1):27-30, 1938.—The Coccinellid, *Aiolocaria (Ithon) mirabilis* Motsch., feeds on the eggs and larvae of *Melasoma vigintipunctata* Scop., *M. populi* L., and *M. adamsi* Baly, in Korea, but not on those of *Agelastica coerulea* Baly. The females feed more than the males and survive about 10 days without food. The oviposition period lasts 5-9 days, most of the eggs being laid in the first 2 days. REV. APPL. ENT.

Sata, T. Tannin and tanning materials, with an enumeration of tanning plants of the world. (In Japanese with English title.) *Formosan Agri. Rev.*, No. 381, p. 408-417, 1938.

Shiraki, T. Cotton insects. Compendium of insect and fungous pests of agricultural crops in Formosa, No. 4. *Publ. Bur. Industr. Formosa*, No. 801, 166 p., 109 fig., 1937.—Some 80 species of insects that occur on cotton plants in Formosa are described, and notes are given on their life-history and control. *Empoasca (Chlorita) biguttula* Mats., is one of the most injurious and is particularly harmful to the early-maturing varieties and those with leaves that have few hairs. *Gossypium arboreum* is generally more resistant to this Jassid than *G. herbaceum*. The varieties with leaves that have a great number of ribs are more resistant to *Aphis gossypii* Glov., which is not particularly injurious on the island. The other pests include *Platyedra (Pectinophora) gossypiella* Saund., *Sylepta derogata* F., *Pyroderces simplex* Wlsm., *Pyrausta nubilalis* Hb., *Brachytrypes portentosus* Licht., and the Lamiid *Sybra ordinata* Bates, which attacks the bolls. REV. APPL. ENT.

Skvertzow, B. W. Subaërial diatoms from Pin-Chiang-Sheng Province, Manchoukuo. *Phil. Jour. Sci.* 65(3):263-282, 4 pl., 1938.—In 3 small samples examined were found 59 forms, 32% of which were new to science and 90% of which were new to Manchuria. "The most interesting finds were *Melosira roesiana* var. *indica*, recently reported by me from Calcutta, India; *Stauroneis parvula* var. *rupestris*, found on rocks near Hangchow, Chekiang, China; *Pinnularia Balfouriana* var. *stauroptera*, known from Kizaki Lake, Nippon; *Hantzschia amphioxys* var. *compacta*, reported from Tibet. The forms found in greatest abundance on the bark of a Manchurian elm in Harbin were *Navicula Lagerheimii* var. *intermedia* and *Hantzschia amphioxys*. On the rock mosses of the Maoershan district *Melosira roesiana* var. *epidendron* and var. *asiatica*, *Achnanthes coarctata*, *Navicula Lagerheimii*

var. intermedia, *N. Kotschii* var. *rupestris*, and *Hantzschia amphioxys* var. *compacta* were the most prevalent. On the mosses from Mifun mountains *Melosira roesiana* var. *asiatica*, *Achnanthes coarctata*, *Navicula Lagerheimii* var. *intermedia*, *N. Kotschii* var. *rupestris*, *N. contenta* fo. *biceps* and fo. *parallela*, *Pinnularia lata* fo. *thuringiaca*, *Hantzschia amphioxys*, with var. *vivax* and var. *compacta* were abundant."

Sonan, J. The grey-streaked Moth, *Prodenia litura* Fab. in Formosa. *Rep. Govt. Res. Inst. Formosa*, no. 70, 69 p., 1 pl., 1937.—A detailed account is given of the bionomics of *P. litura* F., in Formosa. All stages are described. This Noctuid is widely distributed, occurring up to an altitude of about 5,000 ft., and has now been recorded from over 90 species of plants. The adults pair on the day of emergence and oviposit on the leaves of the food-plants, which include ground-nuts, sweet potato, rice, castor and vegetables. Females have been observed to lay up to 14 batches of eggs. The larvae do not feed at temperatures below 15° C. When mature they pass through prepupal stage in the cocoon, which lasts 3.2-8.5 days. In addition to Hymenopterous parasites, the larvae are attacked by the Tachinid, *Cnephalia (Gonia) cinerascens* Rond., and a species of *Sarcophaga*, but none of the natural enemies observed in Formosa is of much importance. A list is given of those recorded throughout the world. Lead arsenate in sprays is effective against young larvae, but older ones do not feed on leaves treated with it. Derris dusts are ineffective, as are also contact sprays, which do not adhere to the smooth body surfaces of the larvae. Trenches can be used to catch larvae that are migrating.

REV. APPL. ENT.

Sterneck, Jakob. Zur Kenntnis von *Lithosia* F. und *Pelosia* Hb. *Zeitschr. Osterr. Ent.-Ver.* 23(5):54-56, 1938.—*Lithosia affineola* Brem. (var. *apraca* Btlr.) is mentioned from West China; 7 species are discussed.

Su Tsu-fei, and Liu, D. Y. Studies on Hunan local food products. I. The Chemical composition and vitamin C content of Hunan citrus fruits. II. **Su, Tsu-fei, and Tu, Tzu-peh.** The antiscorbutic activity of the Hunan Kwang Chu. *Chinese Med. Jour.* 54(1):44-50, 5 fig., 7 tab., 1938.—I. Five species of citrus fruits were studied. Hunan Kwang Chu and 2 species of pemulo were found rich in ascorbic acid, the former being especially recommended. II. The antiscorbutic activity of the Hunan Kwang Chu juice was comparable to that of the Sunkist orange and to that of the real Kwang Chu, and activity corresponded to its ascorbic acid content as determined quantitatively.

Sugimoto, M. Tyroglyphid mites and their injuries. (In Japanese.) *Jour. Taihoku Soc. Agri. For.* 2(3):282-290, 1 fig., 1937.—A description is given of *Carpoglyphus taiwanensis*, sp. n., taken in sugar at Taihoku, Formosa, together with general notes on the morphology of Tyroglyphid mites and the injury they cause.

REV. APPL. ENT.

Tagawa, Motozi. Spicilegium Pteridographiae Asiae orientalis 15. (In English with Japanese summary.) *Acta Phytotax. Geobot.* 7(2):72-87, 1938.—Species no. 186-206 are discussed. There are 9 new species and 12 new combinations. Thirteen species and varieties are recorded from Formosa, 5 from Indo-China, 5 from Yunnan, 1 each from Hupeh, Shensi, Fukien, Chekiang and S. China, 2 each from Szechwan, Kwangsi and Kwangtung, 3 from Kweichow.

Takahashi, R. Some Aphididae from South China and Hainan (Homoptera), III. *Trans. Nat. Hist. Soc. Formosa* 28(172):11-14, 1938.—One new species is included.

REV. APPL. ENT.

Toyama, Reizo. Spicilegium Muscologiae Asiae orientalis, 5. (In German with Japanese summary.) *Acta Phytotax. Geobot.* 7(2):102-111, 41 fig., 1938.—Twelve species and several forms are listed. Six species are from Formosa and one from China.

Tsai, Yu-lin. The blood groups of Yenching students. *Peking. Nat. Hist. Bull.* 12(4) :253-258, 5 tab., 1938.—An examination of 350 men students revealed a constantly high percentage of people belonging to the A group. The percentages for the total group are: O, 28.6; A, 34.9; B, 25.1; AB, 11.4. The distribution of student grades and of intelligence showed no correlation with blood groups.

Uchida, H. Relation of the development of the egg, larva and pupa of *Chaetodacus cucurbitae* Coq., to the fatal effect of fumigation with carbon bisulphide. (Prelim. rept.) (In Japanese.) *Shokubutsu kensa Shiryo* 7(3) :24-25, 1938.—Investigations at Taihoku, Formosa, showed that the effectiveness of the fumigant against the eggs increases with their stage of development. The larvae were least resistant in the first instar and most resistant in the middle of the third. Resistance was greater at the end of the third instar than at the beginning. In the pupal stage, which lasts 10 days at 24°C., it was greater in the middle than at the beginning. The degree of susceptibility seems to be correlated with the amount of respiration.

REV. APPL. ENT.

Uttley, K. H. The epidemiology of bubonic plague in Hong Kong. *Caduceus* 17(1) :1-20, 14 tab., 1938.—Plague reduction in Hong Kong between 1894 and 1923 coincided with improvement of hygienic conditions and with decrease of severity of plague in S. China. Climatic conditions favoring plague occur in spring and early summer. Calculation has been made of the coefficients of correlation between plague and the climatic factors: relative and absolute humidity, monthly mean temperature, rainfall, and barometric pressure. Epidemics are most likely to occur when the mean temperature rises to 63°, the relative humidity to 83%, and the tension of aqueous vapor to 0.500.

Vasilyev, J. Notes on the poplars of the Far Eastern region. (In Russian with English summary.) *Bull. Far East. Br. Acad. Sci. USSR* 28(1) :101-108, 4 fig., 1 tab., 1938.—The author states that until now Russian botanists used to mistake *Populus koreana* for *P. Maximoviczii*. Rehder himself determined adult specimens of *Populus koreana* as *P. Maximoviczii*. The author gives a detailed description of *P. Maximoviczii*, *P. Koreana* and *P. suaveolens* Fisch. The area of *P. Maximoviczii* extends in the north as far as the limit of the Manchurian floristic elements. This species grows in Sakhalin but is absent in Kamchatka. *P. koreana* extends somewhat northward of the middle reach of the Amur. It represents a Manchurian-Japanese race of *P. suaveolens* Fisch. As to its systematic position *P. Maximoviczii* is distant from *P. suaveolens* and *P. koreana*. *P. Maximoviczii* grows abundantly in broad river valleys and *P. koreana* in the region of their headwaters.

Vivien, Jean-Henri. Invasion du littoral français par un crabe chinois, *Eriocheir sinensis* H. M. Ed. *Nature (Paris)* No. 3029, p. 44-46, 4 fig., 1938.—This Chinese crab was first reported in France in 1936 near Boulogne. It has been advancing into the English Channel from the North Sea.

Voss, Eduard. Monographie der Rhynchitinen-Tribus Rhynchitini. 2. Gattungsgruppe: Rhynchitina. *Koleopt. Runds.* 24(3-4) : 129-152, 1 tab., 1938.—This division of the monograph contains a discussion of the zoogeography of Rhynchites. A key is given to the 15 subgenera and to 113 species in 13 of the subgenera. 37 species are from the Manchurian region, 30 from the Indochinese.

Wang, L. S. The action of Paipu (), *Stemona Tuberosa* on lice. *Chinese Med. Jour.* 54(2) :151-158, 5 tab., 1938.—This Chinese drug has been mentioned in early Chinese medical literature as insecticide against lice. Lice were killed in 2 minutes by a 25% alcoholic extract, in one minute by a 50% extract. Applications of either solution on 3 successive days destroyed all eggs. The drug is non-toxic and non-irritating to man.

Watanabe, F. List of insect pests of trees in Japan. 487 and 27 p., publ. by the author, Tokyo, 1937.—Lists, arranged in systematic order and by food-plants, are given of some 2,000 insects attacking trees in Japan, Korea and Formosa.

REV. APPL. ENT.

Wehrli, Eugen. Neue Gattungen, Untergattungen, Arten und Rassen von Geometriden (Lep.). Ent. Runds. 55(31):354-360, 1938.—Species treated include *Abrarac shensiaca* n. sp. from Shensi, *Anemnemestresa* (n. gen.) *flavimaculata* Leech and *Coribapta* (n. gen.) *gigantodes* Wrli. from west and central China.

Wu, K. Cattle as reservoir hosts of *Schistosoma japonicum* in China. Amer. Jour. Hyg. 27(2):290-297, 1938.—12.6% of 399 cattle and 18.7% of 406 buffaloes slaughtered in Shanghai harbored *Schistosoma japonicum*. The public health and veterinary aspects of these results are discussed.

R. T. L. in HELMINTH. ABST.

Wu, Kuang, 吳光. On the occurrence of *Isoparorchis* among fishes in China. Peking Nat. Hist. Bull. 12(4):273-277, 1 pl., 2 fig., 1938.—*I. hypselobagri* was found in China in the swimbladders of the food fishes, *Parasitus asotus*, *Pelteobagrus fulvidraco* and *Odontobutis obscura*; the latter two being probably new hosts for this helminth. A brief description of it is presented, including a general review of the genus and its relation to tropical medicine.

AUTHOR'S SUMMARY

Wu, K. Progenesis of *Phyllodistomum lesteri* sp. nov. (Trematoda: Gorgoderidae) in fresh-water shrimps. Parasitol. 30(1):4-19, 1938.—Wu describes the metacercaria state of *Phyllodistomum lesteri* n. sp., found encysted in the liver and gonads of fresh-water shrimps of the genus *Palaeomon*, in China. Although the adult stage and final host are unknown the larva is sufficiently mature to enable it to be distinguished from other species. The forms in the liver reach a higher state of maturity than those in the gonads, eggs to the number of 116 occurring in the uterus of one specimen, and showing developing miracidia. E. M. S. in HELMINTH. ABST.

Yasunatsu, Keizo. A revision of the genus *Sphex* Linne of the Japanese Empire. Tenthredo 2(1):44-135, 9 fig., 2 tab., 1938.—A taxonomic revision of the 16 species known from the Japanese Empire is given. Eight of the species are known from Manchuria, 9 from Formosa and 5 from Korea. Two others are suspected in Korea. Descriptions and complete distribution records are given for each species. New species include *Sphex (Isodontia) sonani* from Formosa. The bibliography has 149 references.

Yoneda, Yuichi. Cyanophyceae of Japan, II. (In English with Japanese summary.) Acta Phytotax. Geobot. 7(2):88-101, 21 fig., 1938.—Species no. 44 to 62 are discussed, in the families Chroococcaceae, Chamaesiphonaceae, Stigonemataceae, Rivulariaceae, Nostoccaceae, Oscillatoriaceae. None are new, most are cosmopolitan species.

Zimmermann, Alois (continued by L. Gschwendtner). Monographie der palaarktischen Dytisciden. IX. Dytiscinae. Coleopt. Runds. 24(1-2): 33-72; (3-4):73-76, 1938.—In this section of the monograph are described 16 species of the subgenus *Macrodytes* Thoms. of *Dytiscus* L. and *D. latissimus* L. Sixteen species of *Cybister* Curt. are also treated. The following are from the Chinese region: *D. (M.) latro* Sharp and *D. (M.) dauricus* Gebl. from Manchuria; *C. suggillatus* Er. from China, Tibet and Cochinchina; *C. convexus* Sharp from W. China; *C. tripunctatus* subsp. *orientalis* Gschw. from S. China; *C. lewisianus* Sharp from China and Tongking; *C. confusus* Sharp from China; *C. limbatus* F. from Cochinchina, China, Formosa; *C. Guerini* Aube from Tongking, Annam and China; *C. lateralmarginalis* De Geer from SW. Mongolia; *C. japonicus* Sharp from Formosa, China, and Manchuria.

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